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FINAL REPORT

VEGETATION PATTERNS: 1960-1990*
GREAT SAND DUNES NATIONAL MONUMENT

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INTERAGENCY AGREEMENT NUMBER 1268-19105

WORK ORDER NUMBER IRS-1

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DECEMBER 10, 1992

COVERING THE TIME PERIOD MAY 15, 1991 - DECEMBER 15, 1992

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* Because of the unexpected availability of 1936 aerial photographs subsequent to the awarding of the agreement and by agreement with Great Sand Dunes National Monument personnel, the time period is actually 1936-1990.

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ABSTRACT

The vegetation of Great Sand Dunes National Monument (GDSM) was mapped during the 1991 field season by collecting data from 118 0.01 ha (0.025 ac) permanently marked, mostly circular plots. Plot sampling was by the releve method of the Zurich-Montpellier School of Plant Ecology. Each plot was photographed, its vascular plant species indentified and classified by Daubenmire cover class, and its cover summarized by plant class and physical characteristics. Objective multivariate statistical techniques suggested that GDSNM vegetation is composed of separate species associations for the dune mass, sand sheets, marsh and streambank (riparian) wetlands, and the peripheral mountainsides. Fifty-nine species from 26 plant families were discovered to bring the known vascular flora of the park to 347 species. The water dependance and relationships of each of these plant species is presented; species occurring in the Monument's marshlands would be endangered if these lands continue to desiccate. Comparative aerial photographs from 1936 and 1990 reveal that the western marshlands and ponds of GSDNM have been dramatically reduced over that time span. Some other changes are also documented over that time period from the aerial photographs but the dune mass proper appears to have been remarkably stable.

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POCKET MAP

1:24,000 scale topographic map of Great Sand Dunes National Monument with study site marked .....inside back cover

INTRODUCTION

This project was designed to characterize and map the vegetation of the Great Sand Dunes National Monument, Colorado (GSDNM) and to determine if the vegetated areas in the dune field are permanent, temporary, or migratory. It was not known if the vegetation around the dunes was encroaching on the dunes, being replaced by the dunes or was stable for the time period of study for which aerial photographs were available (1936-1990). There were also concerns about the possible effect of a proposed water export project adjacent to GSDNM would have on the dunes and their vegetation. So one of our objectives was to provide the expected consequences of a lowered water table on the GSDNM flora.

STUDY AREA AND METHODS

The study area was the entire GRSDNM (Fig. 1) which is located in the San Luis Valley in south-central Colorado straddling the Alamosa and Saguache county line. Current vegetation patterns were characterized by establishing a grid system of plots throughout GSDNM based on section corners and ongoing sand trap dune movement assays. The grid was supplemented by additional plots in smaller and more unique vegetative communities. Fewer plots were put in the large vegetatively depauperate sand dune areas. In these areas plots were purposely placed where some vegetation was present; but the center of the plot within that vegetation was located in a random manner. We saw no purpose in scoring areas with no vegetation. We determined the relative area lacking vascular plants in these dune mass areas by recording the number of m^2 (10.8 ft^2) plots in 25 1 m (3.3 ft) wide transects 100 m (328 ft) long in the

general area of D7, D8, E7, and E8 (Fig. 2A). Data from 10 comparison transects on the sand sheet were collected from the general area of B7, B8, C7, and C8 (Fig. 2A). Means with standard deviations (sd) and a t test (Woolf 1968) were used to evaluate this data. Circular plots (0.01 ha = 0.025 ac) were marked with the placement of 30 cm (12 in) steel bars. A few plots (Appendix C) were rectanguar in shape to keep them within certain plant communities, e.g., riparian. Plot sampling was by the releve methodology developed by the Zurich-Montpellier School of Plant Ecology (Shimwell 1971, Harper et al. 1988). Each plot was photographed, its parental geological material recorded (Johnson 1969, Tweto 1979), vascular plant species identified (Welsh et al. 1987, Weber 1990) and classified by cover class (< 1 %, = + , 1 - 5 % = 1, 6 - 25 % = 2, 26 - 50 % = 3, 51 - 75 % = 4, 76 - 95 % = 5, > 95 % = 6; modified from Daubenmire 1959) and sociability class (single, widely spaced individuals = 1, small groups = 2, small patches = 3, extensive patches = 4, nearly pure stands = 5; Harper et al. 1988), and a summary of the plot's cover made by percent tree layer, shrub layer, herb layer, cryptogamic layer, litter, rock (> 1 cm), and bare soil. Plant and water relationships were inferred from Harrington 1954, Cronquist et al. 1972, 1977, 1984, Hitchcock and Cronquist 1973, Welch et al. 1987, Barneby 1989, and Weber 1990.

Plant communities were objectively identified by using multivariate statistical techniques we developed (McArthur and Sanderson 1992). We used two complementary clustering methods. Both methods are based on the co-occurrence of species. However, in the prevalence method, Prevalence Affinity, $P_A = N_{S2}/N_{S1}$, where N_{S1} = number of plots with species 1 in the species plots under consideration and N_{S2} = number of plots with species 2 co-occurring with species 1. In the uniqueness method, corrected for random expectation, Uniqueness Affinity, $U_A = (N_{S2} * N_{TS})/(N_{S1} * N_{T1})$, where N_{TS} =

total number of plots in the study, N_{T1} = total number of plots of species 1 in the complete study, and the other symbols are as in the P_A model.

Concurrent with our travel to and from study plots we supplemented the existing list of vascular plants (Great Sand Dunes National Monument Staff 1986) by collecting herbarium specimens of plants heretofore unknown from GSDNM which we have subsequently deposited in the herbaria of GSDNM, the Shrub Sciences Laboratory (SSLP), and Snow College.

A generalized vegetation map was composed by comparing the "ground truth" vegetation plots with April 30, 1990 aerial photographs. Comparison between 1990 and 1936 were made by careful side by side study of the 1990 aerial photographs with a set of aerial photographs from August 12, 1936.

RESULTS AND DISCUSSION

Data from the 118 plots (Fig. 2A) subjected to P_A and U_A clustering sorted the plots into three prevalence clusters (Stabilized and Active Dunes, Wetlands, and Mountainside) and six complementary uniqueness clusters, two each for the prevalence clusters (Active Dunes, Stabilized Dunes, Marsh, Streambank, and two Mountainside clusters) (Table 1). The two clustering procedures objectively classify natural vegetation communities (Fig. 2B, 2C, 2D). The dry sand communities are either on the large active dune mass or on adjacent smaller stabilized dunes (sand sheets). All the active dune species are found on the stabilized dunes as well but the converse is not true. The wetland communities are along the stream courses or at other locations of surface water or high water tables. The tightest clustering in the whole study is the Marsh Uniqueness cluster. Mountainside communities are poorly differentiated because the relatively small area included few plots for our study. Mountainside

communities are on the slopes of the Sangre de Cristo Mountains which flank GSDNM on the north and east and are included only at the edge of GSDNM. The usefulness of our clustering method is illustrated by comparing means within cluster vs. means between clusters: P_A is 217.8 vs. 78.2; U_A is 291.2 vs. 93.1.

The vegetation map, Fig. 3, shows the active dune vegetation (dune mass), stabilized dune vegetation (sand sheets), riparian area vegetation, pond and marsh area vegetation, and the alluvial slopes and mountain vegetation. The latter vegetation type is extremely heterogeneous but is not differentiated on our map because our sampling scheme did not adequately differentiate subtypes and these subtypes interfinger in complex mosaics. Using Landsat satellite data, Hoffer et al. (1992) map six vegetation types in the alluvial slopes and mountain areas of Fig. 3.

Comparison of the 1936 and 1990 aerial photos did not show any dramatic shifts in the central dune mass, sand sheet, or alluvial slope and mountain vegetation patterns. In fact, these photos reveal remarkable stability as the outstanding feature. Close examination, however, show some interesting differences. Fig. 4 locates 10 sets of paired photos (Figs. 5-14) which document changed (and similar) vegetation patterns between these 54 year "snapshots". Note that none of these paired photos are drawn from the dune mass area (Figs. 2, 4). Changes in that area were not apparent by careful comparison of the photos from the two dates. The most striking differences relate to the differences in the water table. Figs. 5 and 6 demonstrate that there was much more surface water in 1936; and this despite the fact that the 1990 photos were in the spring when more surface water would be expected in comparison to late summer when the 1936 photos were taken. The ca. 10.4 km^2 (4 mi^2) area to the east of Sand Creek in Fig. 5 contained 60 ponds in 1936

but only 3 in 1990. One reverse case of surface water is illustrated (Fig. 7). In this case we hypothesize that blowouts may have been scoured by wind action and filled with water. However, the few new wetlands in no way counterbalance the many that have dried up. Remnants of the former wetlands abound in the form of residual wetland woody vegetation, both living and dead in the desiccated potholes. Other interesting comparisons are: Fig. 8, where a 1987 fire scar is present in 1990--this scar is also visable at the bottom of Fig. 9 in the 1990 photo; Fig. 8 also reveals a loss of woody or riparian vegetation over the time interval; Fig. 9, where apparently fenced areas of evident different land management practice are visible in 1936 but have disappeared in 1990; Fig. 10, where there has been substantial movement [ca. 260 m (850 ft) in the lower dune and ca. 320 m (1,050 ft) in the upper dune] of sand dunes to the northeast from 1936-1990; Fig. 11, where the pinyon-juniper woodland has remained remarkably stable between the time intervals but roadway and gullying disturbances of 1936 have evidently healed in 1990; Fig. 12, where an aspen (Populus tremuloides) forest closed its canopy from 1936 to 1990; Fig. 13, where escape dunes, east of Medano Creek, buried and killed a grove of ponderosa pine (Pinus ponderosa) during the time interval; and Fig. 14, where a grove of hawthorne (Crataegus rivularis) has possibly thinned and spread out over the time interval.

We discovered 59 species from 26 families new to the flora of the monument (Table 2). This represents an increase of 20 % over the number (288) of species previously known to occur at GSDNM (Great Sand Dunes National Monument Staff 1986). This increased number was obtained in an incidental way as we recorded plot data and traveled to and from plots. We believe a systematic search for new species would be productive.

The dune mass proper is mostly depauperate of vegetation. Our transect data had a mean value of 15.84 % $\pm$ 19.78 sd (range, 0-70%) of the m^2s (10.8 ft^2) having vegetation (= 84.16 % bare). The corresponding values for the sand sheet were 99.70 % $\pm$ 0.67 of the m^2 (10.8 ft^2) areas having vegetation (range, 98-100%). These values are significantly ($p < 0.05$), df = 1, t = 13.27).

Appendix A lists all species now known to occur in GSDNM with our appraisal of their water requirements and suggests impacts of lowering the water table. Appendix B is a series of species occurrence maps based on our sample plots; it includes all species (81) that occurred in at least six plots. Appendixes C and D are the data sheets and photographs of each plot.

Climatic change in the future might be expected to cause decreases in winter precipitation in the area but possible increases of summer rain with greater incursion of tropical airstreams (Harrington 1987). In an extreme case, the dunes might desicate causing them to flatten out and mobilize. Large amounts of sand might be carried into the lower mountain slopes. On the other hand, summer rains could prevent desication and lead to increases of stabilization over what we have now due to increases of warm season grasses. Because of the large degree of uncertainty about climatic change (if any), it is not clear what trends may result for the Sand Creek-Indian Springs wetlands. These wetlands (marsh and pond area) are not fed by direct stream flow. They are critically dependent for their existence of near-surface (perched) water tables (Magee and Mueller 1992). Any significant water table lowering would result in the destruction of these wetland ecosystems as well as the destruction on the neighboring wetlands to the west of GSDNM.

CONCLUSIONS

Proposed export of the water from the San Luis Valley aquifer could impact the Sand Creek-Indian Springs aquifer by lowering the regional water table and drying up the wetlands. The senario of possible climatic deterioriation coupled with tapping the aquifer may subject the remaining wetlands to to terminal stress. We think it is a risk not worth taking.

ACKNOWLEDGEMENTS

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FIGURE CAPTIONS

Figure 1. Location of study area, Great Sand Dunes National Monument, Colorado

Figure 2. Locations of study plots and vegetation clusters, Great Sand Dunes National Monument. 2A. Location of vegetation survey plots. The hatched area outlines the main dune mass. The Monument boundary follows the outside line. 2B. Location of dunes vegetation cluster. 2C. Location of wetlands vegetation cluster. 2D. Location of mountainside vegetation cluster.

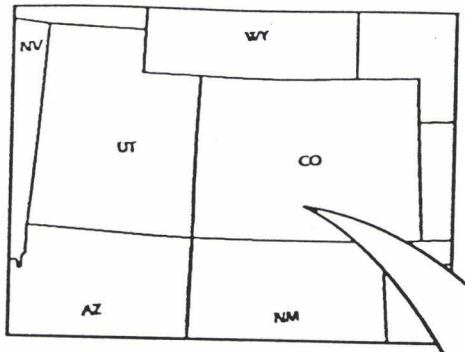
Figure 3. Map of the generalized vegetation types of the Great Sand Dunes National Monument.

Figure 4. Map key to the aerial photographs of Figs. 5-14. The numbers on the map are those of the subsequent figures.

Figures 5 - 14. Aerial photograph comparisons between August 12, 1936 and April 30, 1990. The 1936 photographs are all to the top or to the left. East is to the top of all figures but 12 and 13 in which cases north is to the top. The lines at the bottom of the figures are 1.6 km (1 mi) for Figs. 5, 8, 10; 0.8 km (0.5 mi) for Figs. 7, 9, 11, 12, 13; 0.4 km (0.25 mi) for Fig. 14; 0.16 km (0.1 mi) for Fig. 6. Fig. 5. Sand Creek, note the large number of ponds in the 1936 photograph. Small arrows point out location of Fig 6. Fig. 7. Southwest ponds, the two ponds visable on the right (south) of the 1990 photograph were actively being filled in by a dune slip face in 1991. Fig. 8. Lower Medano Creek, the 1990 photograph shows evidence of the 1987 wildfire (light color, right center of photograph). Note the loss of small marshes (visible in the lower center of the 1936 photograph) during the time interval. Fig. 9. Lower Medano Creek, the arrows in the 1936 photograph point out what we interpret to be fensed pastures which are no longer evident in the 1990

photographs. The burned area of Fig. 8. is evident at the lower center of the 1990 photograph. Fig. 10. Southwest corner of GSDNM, evidence of dune movement on the sand sheet. Dotted areas in the 1990 photograph show the 1936 position of dunes. Fig. 11. Pinyon-juniper woodland in the southeast portion of GSDNM. Note the entrance road, fault line, and Denton Spring (circular area, right center of photographs, near the fault line). Fig. 12. Aspen grove, at mouth of Morris Gulch, near Visitor's Center (1990). Fig. 13. Escape dunes east of Medano Creek and south of Castle Creek. The grove of ponderosa pine near the center of the 1936 photograph have disappeared in the 1990 photograph. Fig. 14. Hawthorne patch, south of Medano Creek. The "c" shaped patch of vegetation in the 1936 photograph is the hawthorne patch. Appaarently, long shadows in the 1936 photograph make the patch stand out more clearly than is evident in the 1990 photograph. The 1990 photograph reveals some woody vegetion recruitment directly north of the hawthorne patch along the south bank of Medano Creek.

Great Sand Dunes National Monument Locator Map



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Alamosa Co.

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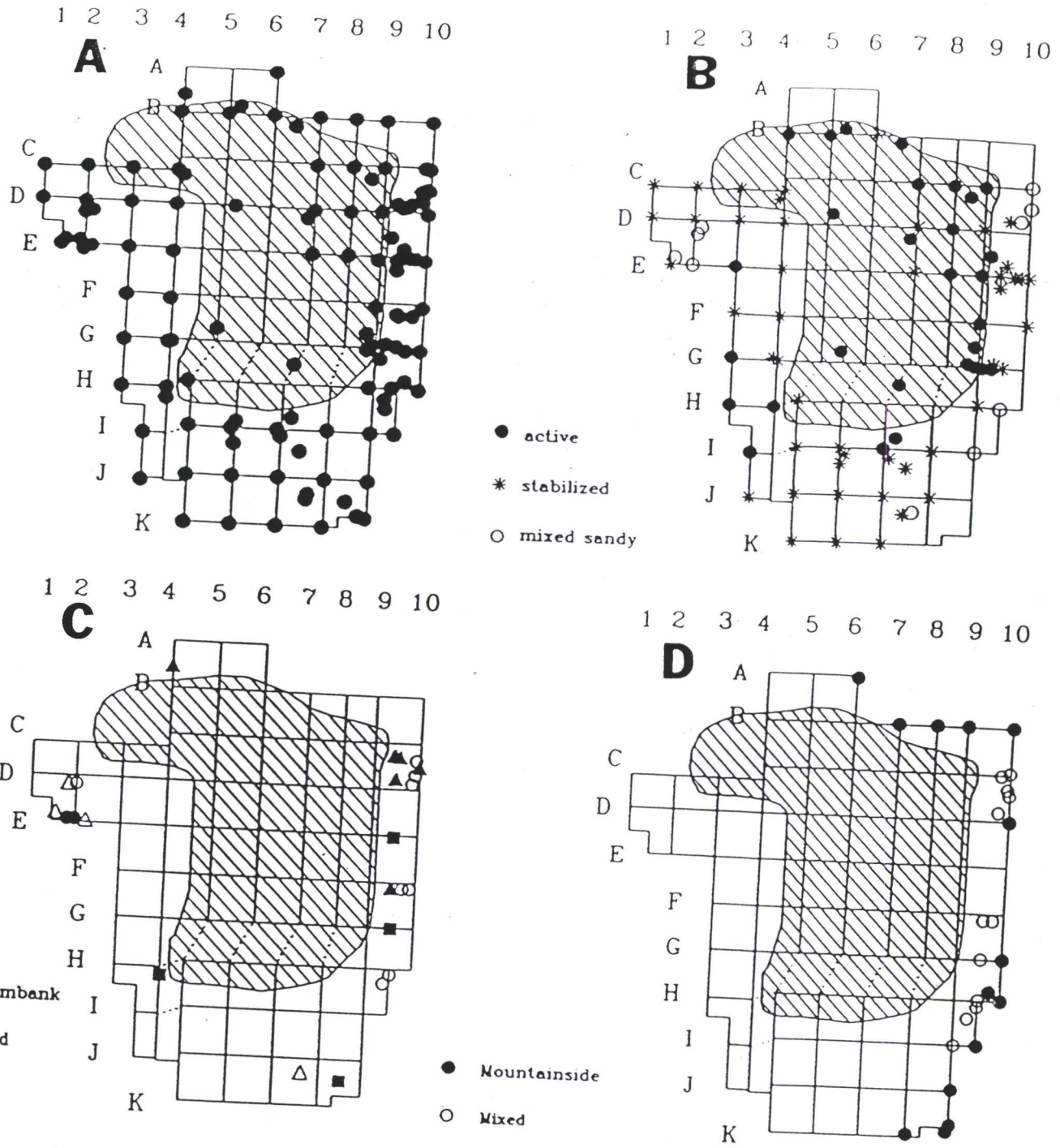
1 Mile 2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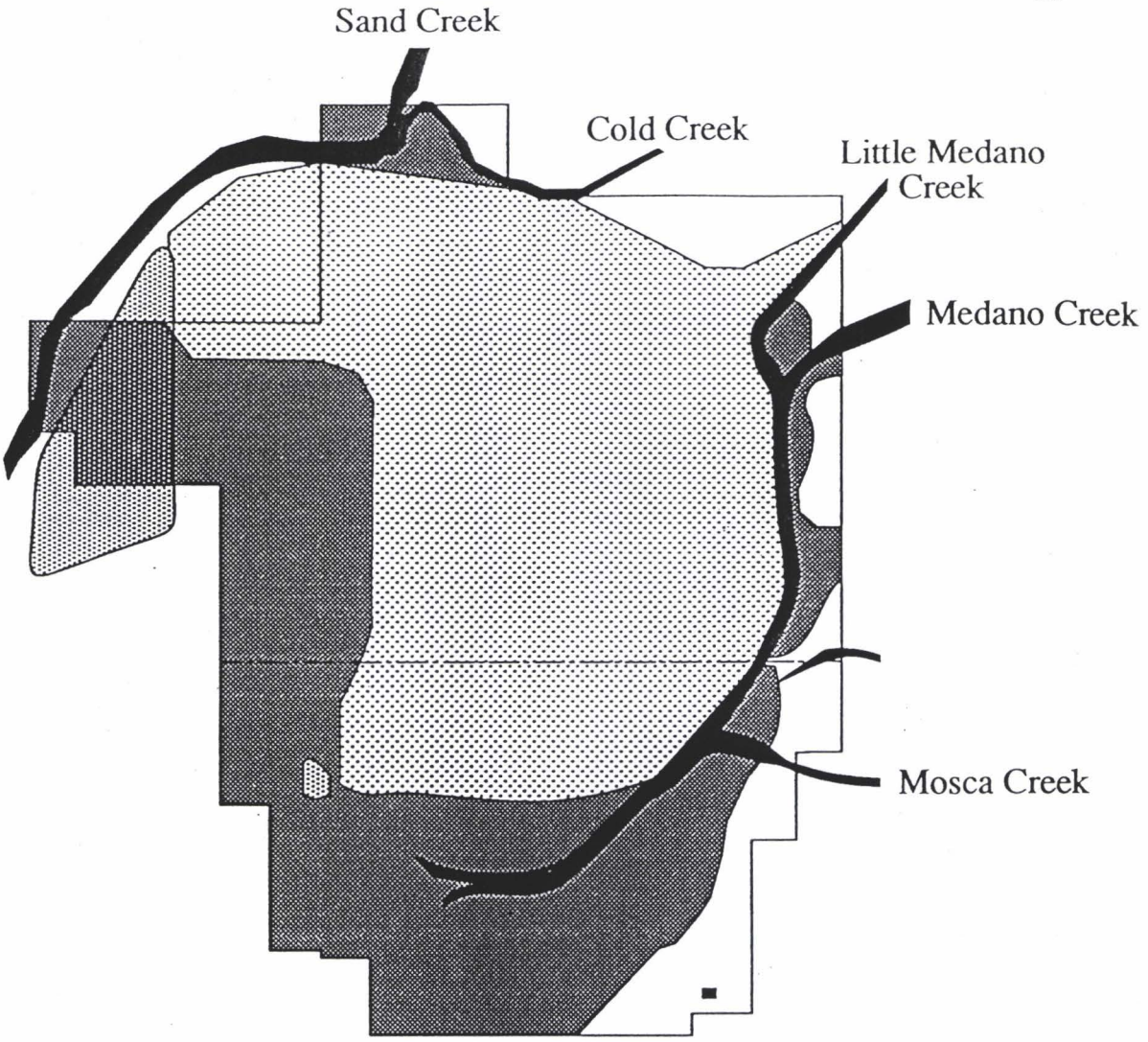


Active Dunes

Stabilized Dunes

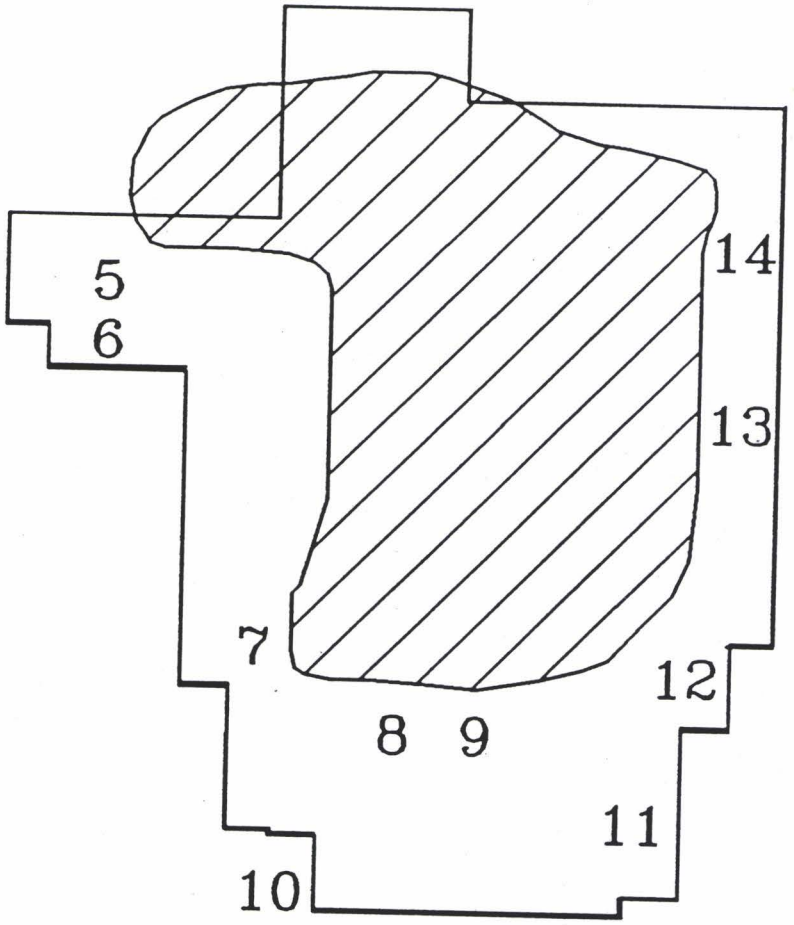
Pond and Marsh Areas

Riparian Zones

Alluvial Slopes and Mountain

Great Sand Dunes National Monument

Vegetation Zones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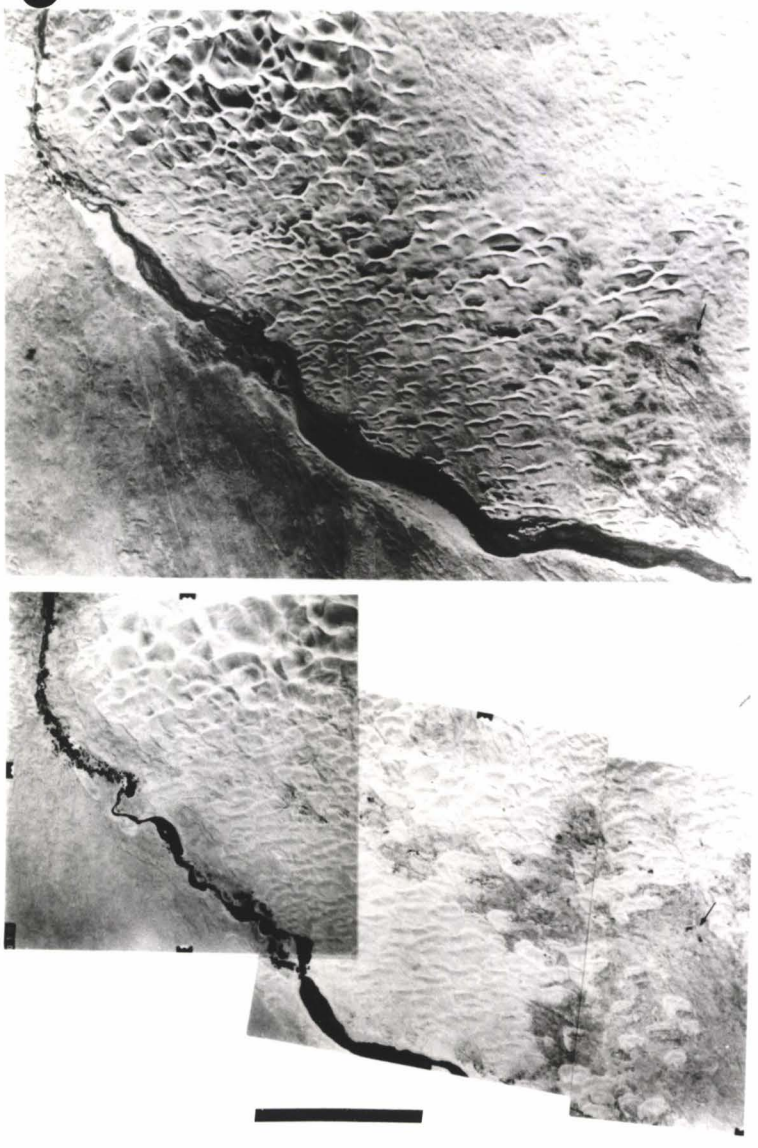

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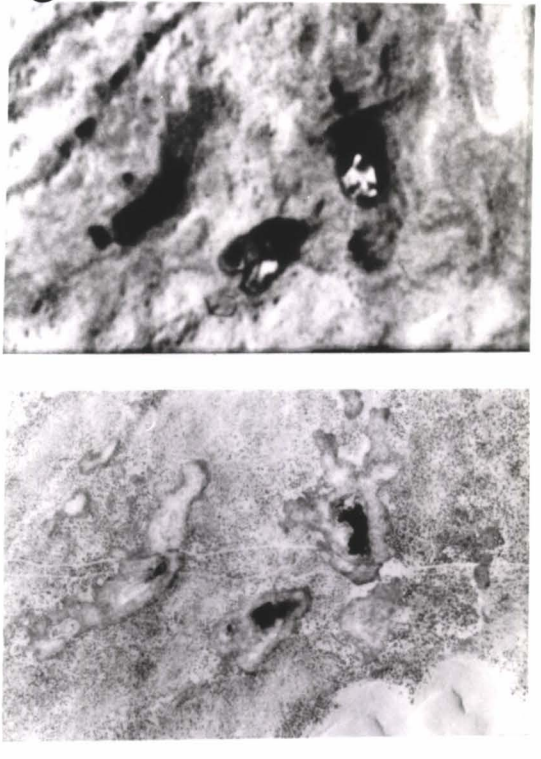

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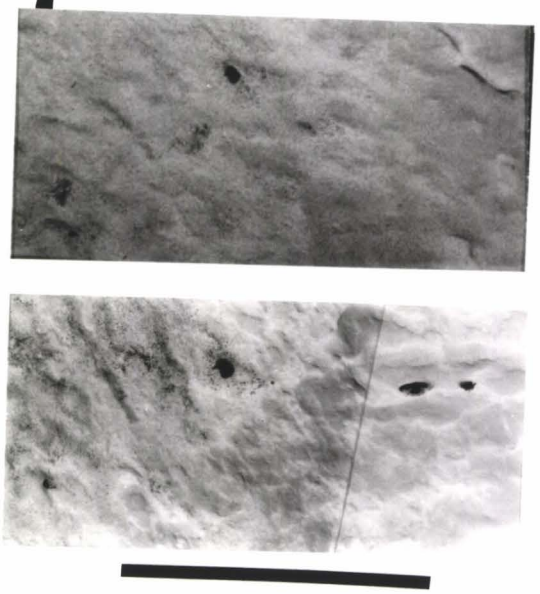

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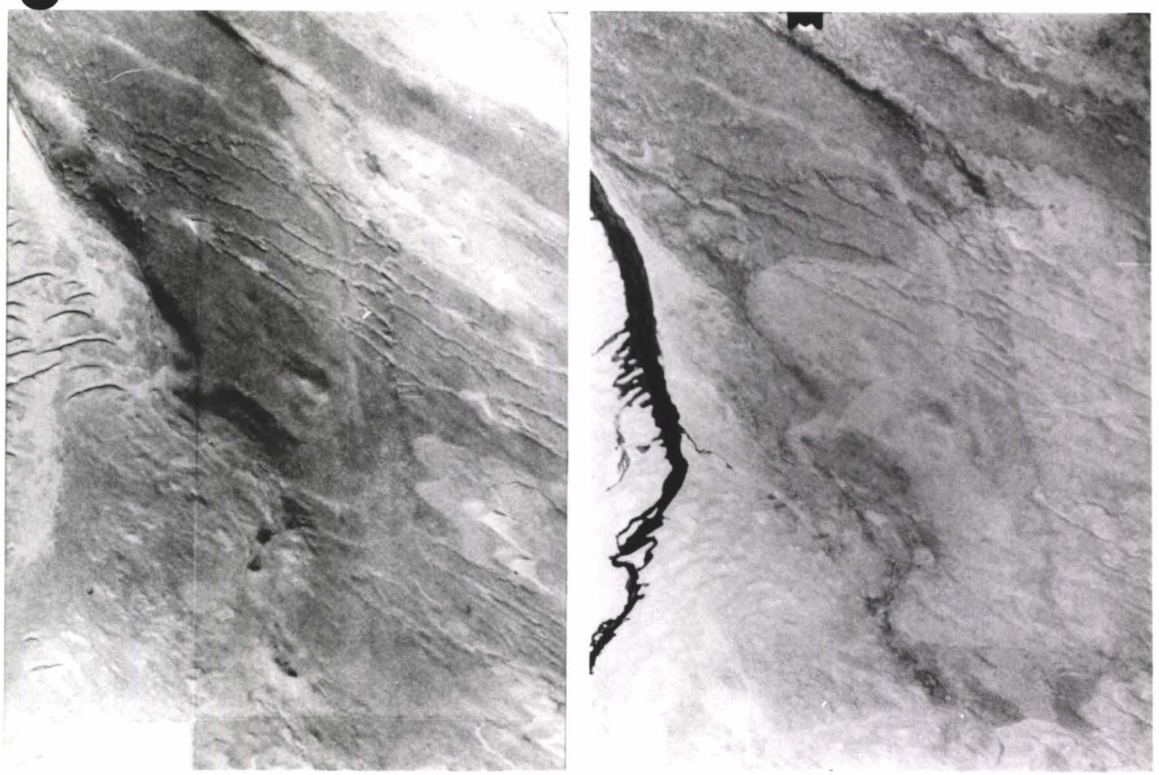

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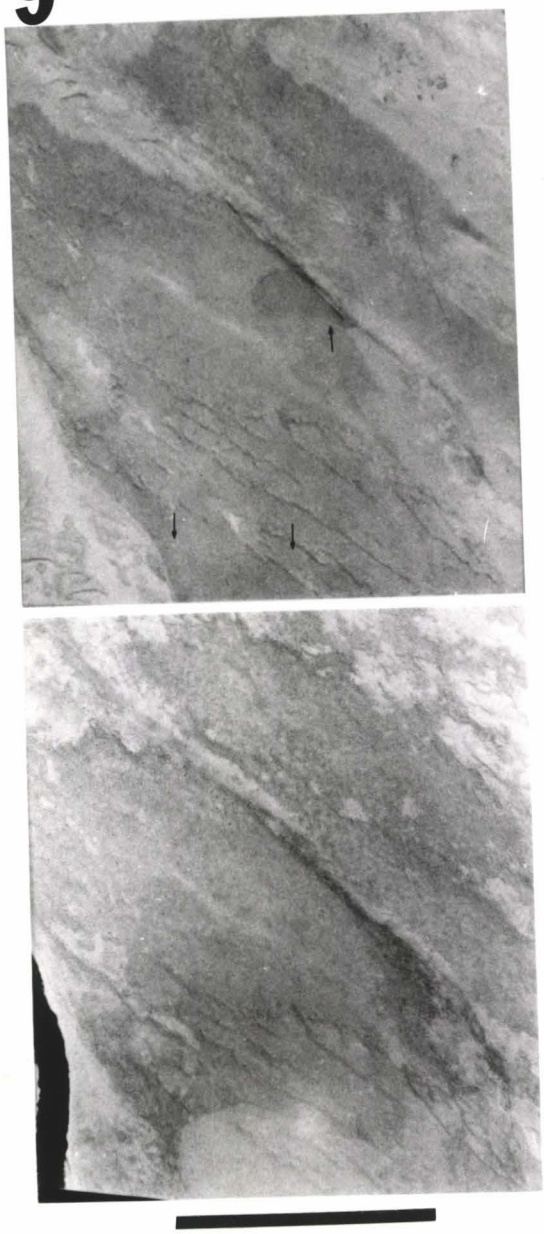

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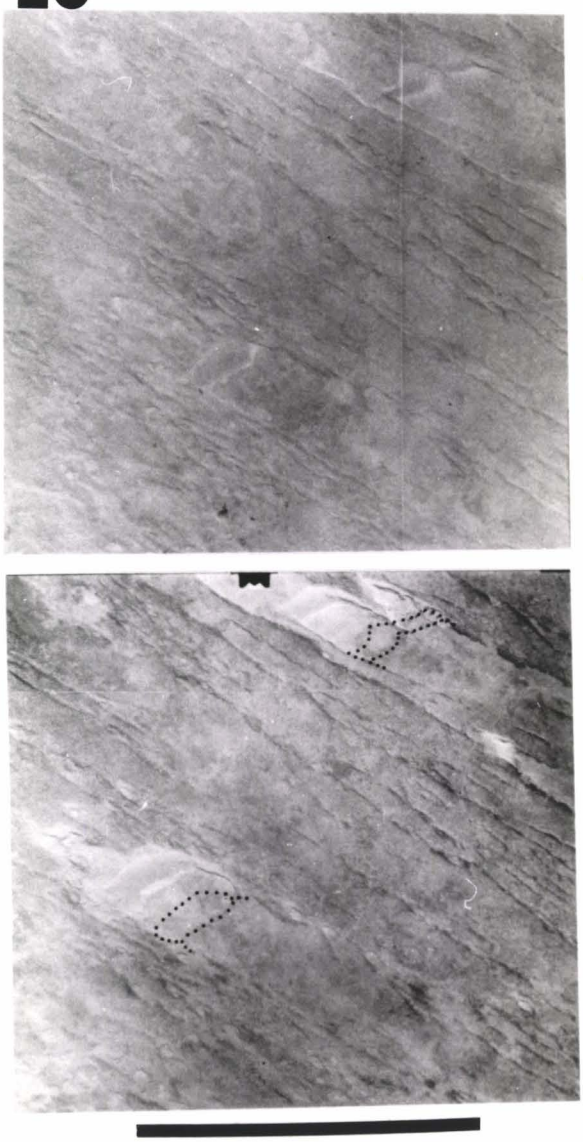

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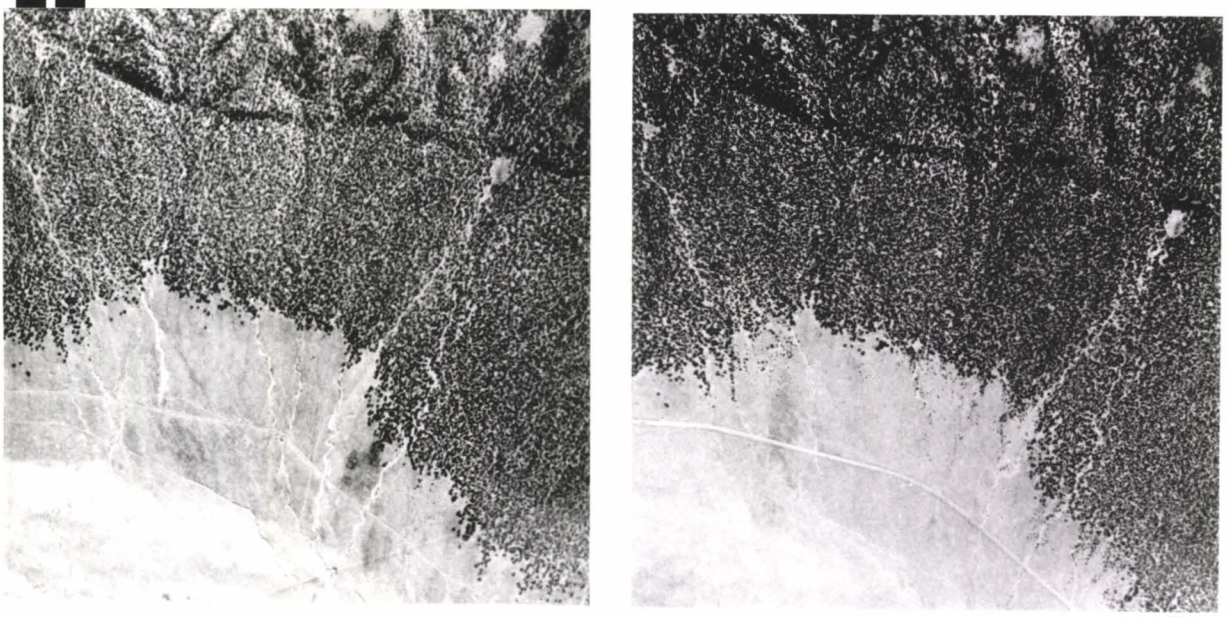

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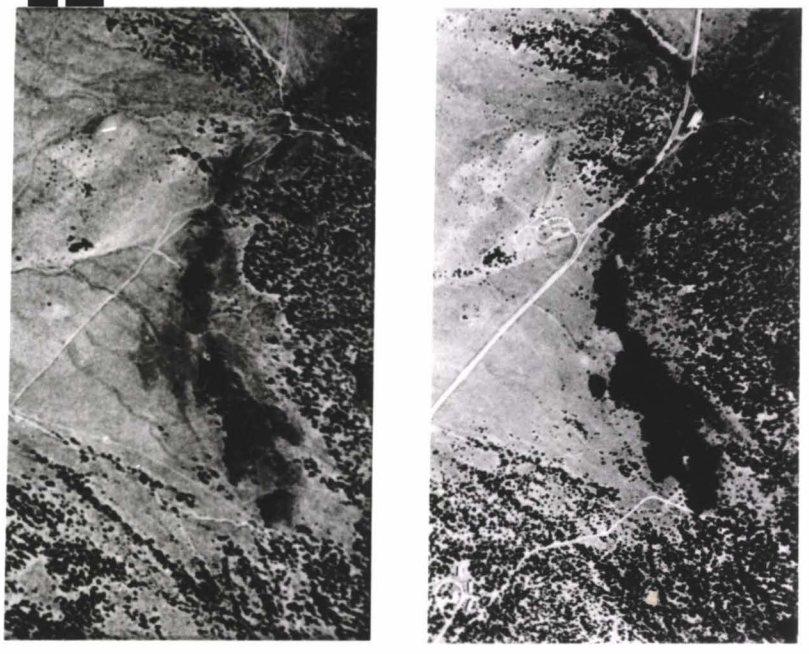

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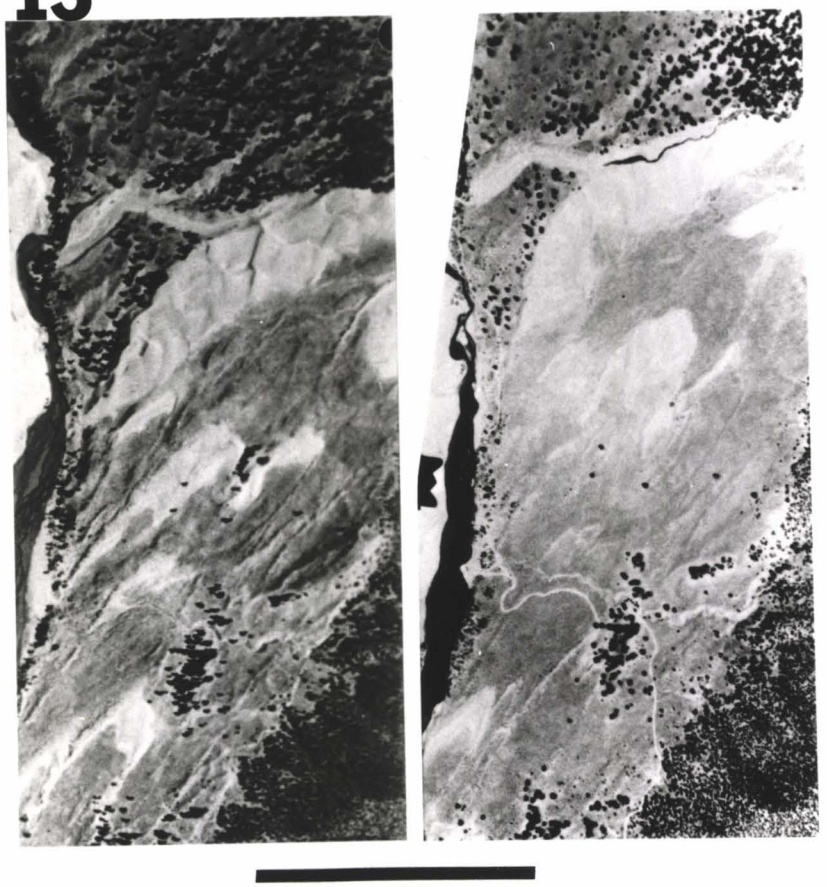

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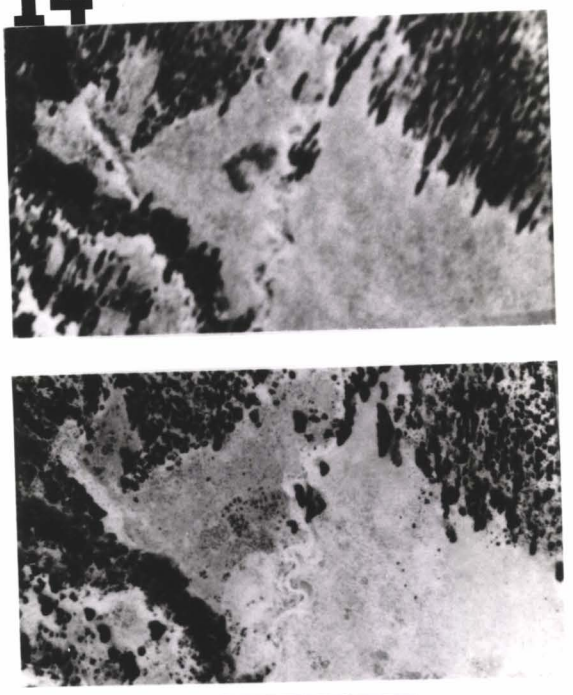

Table 1.--Vegetative communities as determined by prevalence and uniqueness clustering (McArthur and Sanderson 1992).

Prevalence Clustering

Stabilized and Active Dune Species (78 plots, plus 8 mixed)

Clustered species	Plots	Relative affinity
Redfieldia flexuosa	61	207.5
Psoralea lanceolata	60	181.5
Oryzopsis hymenoides	56	199.5
Helianthus petiolaris	56	217.0
Chrysothamnus nauseosus	49	176.6
Senecio sparteoides	47	160.6
Lygodesmia juncea	37	211.1
Sporobolus cryptandrus	31	197.8
Stipa comata	30	158.6
Corispermum nitidum	28	240.7
Oenothera coronopifolia	28	222.2
Cryptantha fendleri	18	174.6
Yucca glauca	16	165.1
Ambrosia acanthicarpa	15	226.1
Muhlenbergia pungens	14	208.1
Cryptantha jamesii	13	201.8
Salsola kali	13	196.8
Penstemon angustifolius	11	187.9
Eriogonum cernuum	10	201.2
Lithospermun incisum	9	200.1
<6 plots (23 species)	--	225.0
Weakly Clustered (9 sp.)	--	129.0
Shared: -none-	--	--

Uniqueness Clustering

Active Dunes (29 plots, plus 47 shared with Stabilzed Dunes, plus 9 mixed)

Clustered species	Plots	Relative affinity
Redfieldia flexuosa	61	253.2
Helianthus petiolaris	56	248.5
Lygodesmia juncea	37	259.8
Corispermum nitidum	28	362.5
Oenothera coronopifolia	28	282.0
Ambrosia acanthicarpa	15	379.1
Salsola kali	13	278.6
<6 plots (4 species)	--	375.3
Weakly Clustered (5 sp.)	--	195.8
Shared: Stabilized Dunes (11 sp.)	--	258.1

Stabilized Dunes (47 plots, all shared with Active Dunes, plus 7 mixed)

Clustered species	Plots	Relative affinity
Sporobolus cryptandrus	31	249.7
Muhlenbergia pungens	14	257.2
Cryptantha jamesii	13	266.5
Eriogonum cernuum	10	244.7
Lithospermum incisum	9	289.2
<6 plots (8 species)	--	265.9
Weakly Clustered (9 sp.)	--	200.7
Shared: Active Dunes (11 sp.)	--	265.6

Table 1(con't.).--Vegetative communities as determined by prevalence and uniqueness clustering.

Prevalence Clustering

Wetlands (13 plots, plus 11 mixed)

Clustered species	Plots	Relative affinity
Agropyron smithii	14	176.8
Juncus balticus	11	294.7
Populus angustifolia	10	217.2
Bromus anomalus	10	197.0
Poa praetensis	10	265.1
Taraxacum officinale	10	259.6
Ribes leptanthum	9	217.0
Rosa woodsii	9	284.9
Salix exigua	8	294.0
Rhus trilobata	7	177.3
Carex sp.	7	278.7
Achillea lanulosa	7	285.0
Populus tremuloides	6	260.8
Alnus tenuifolia	6	317.0
Agropyron trachycaulum	6	264.4
Agrostis stolonifera	6	315.6
Muhlenbergia asperifolia	6	284.7
Aster chilensis	6	259.5
Epilobium glandulosum	6	317.0
Equisetum arvense	6	317.0
Lactuca tatarica	6	249.3
Smilacina stellata	6	227.1
<6 plots (94 species)	--	295.1
Weakly Clustered	--	126.3
Shared: Mountainside (3 sp.)	--	157.3

Uniqueness Clustering

Marsh (2 plots, plus 4 shared with Streambanks, plus 8 mixed)

Clustered species	Plots	Relative affinity
Agropyron smithii	14	272.8
Muhlenbergia asperifolia	6	569.8
Lactuca tatarica	6	396.4
<6 plots (22 species)	--	608.2
Weakly Clustered (2 sp.)	--	194.4
Shared: Streambank (48 sp.)	--	310.8

Streambank (6 plots, plus 4 shared with Marshes, plus 10 mixed)

Clustered species	Plots	Relative affinity
Populus angustifolius	10	251.9
Poa praetensis	10	289.9
Ribes leptanthum	9	239.2
Rosa woodsii	9	326.5
Salix exigua	8	303.8
Carex sp.	7	271.6
Populus tremuloides	6	322.0
Alnus tenuifolia	6	367.5
Agropyron trachycaulum	6	289.4
Equisetum arvense	6	367.5
Smilacina stellata	6	261.7
<6 plots (26 species)	--	339.3
Weakly Clustered (6 sp.)	--	195.1
Shared: Marsh (48 sp.)	--	292.7

Table 1(con't).--Vegetative communities as determined by prevalence and uniqueness clustering.

Prevalence Clustering

Mountainside (15 plots, plus 11 mixed)

Clustered species	Plots	Relative affinity
Erysimum asperum	28	181.7
Opuntia polycantha	25	171.9
Symphoricarpos oreophilus	22	182.3
Artemisia frigida	22	180.5
Heterotheca villosa	20	180.3
Juniperus scopulorum	19	170.1
Bouteloua gracilis	19	164.1
Senecio tridenticulatus	19	159.8
Sitanion hystrix	15	190.0
Pinus edulis	13	203.4
Carex rossii	13	212.9
Festuca ovina	13	201.1
Machaeranthera canescens	13	183.5
Poa fendleriana	12	201.5
Eriogonum jamesii	12	217.6
Muhlenbergia montana	11	221.5
Androsace septentrionalis	11	202.2
Cercocarpus montanus	10	223.6
Holodiscus dumosus	10	216.2
Ribes cereum	10	213.1
Oryzopsis micrantha	10	184.1
Chenopodium fremontii	10	176.1
Senecio fendleri	10	168.5
Pseudotsuga menziesii	9	202.5
Descurainia pinnata	9	202.3
Gilia aggregata	9	170.8
Abies concolor	8	193.7
Arabis lignifera	8	217.9
Arabis hoelboellii	7	214.5
Chrysothamnus viscidiflorus	6	181.3
Ribes aureum	6	209.7
Koeleria nitida	6	226.7

Uniqueness Clustering

Mountainside A (0 plots, 15 shared with B, plus 11 mixed)

Clustered species	Plots	Relative affinity
Poa fendleriana	12	245.2
Androsace septentrionalis	11	226.0
Ribes cereum	10	242.4
Abies concolor	8	230.2
Penstemon barbatus	6	262.4
<6 plots (5 species)	--	252.3
Weakly Clustered (25 sp.)	--	190.3
Shared: Mountainside B (22 sp.)	--	261.2

Mountainside B (0 plots, 15 shared with A, plus 11 mixed)

Clustered species	Plots	Relative affinity
Carex rossii	13	238.7
Festuca ovina	13	220.3
Eriogonum jamesii	12	246.3
Holodiscus dumosus	10	245.5
Pseudotsuga menziesii	9	228.4
Descurainia pinnata	9	229.0
Arabis hoelboellii	7	250.1
Ribes aureum	6	256.1
Gilia pinnatifida	6	233.2
<6 plots (3 species)	--	247.9
Weakly Clustered (23 sp.)	--	190.3
Shared: Mountainside A (22 sp.)	--	249.5

Unclustered species using the Uniqueness method (the Prevalence method produced no unclustered taxa):

present in 6 or more plots . . . 28 species
present in <6 plots . . . . . 23 species

Table 1(con't).--Vegetative communities as determined by prevalence and uniqueness clustering.

Prevalence Clustering

Mountainside (con't)

Clustered species	Plots	Relative affinity
Gilia pinnatifida	6	203.1
Lappula redowskii	6	185.7
Penstemon barbatus	6	206.1
<6 plots (51 species)	--	211.7
Weakly Clustered (9 sp.)	--	131.4
Shared: Wetlands (3 sp.)	--	160.7

Table 2.--Species newly discovered in 1991 at Great Sand Dunes National Monument

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Apocynaceae

Apocynum androsaemifolium

Cannabaceae

Humulus lupus ssp. *americanus*

Capparidaceae

Cleome multicaulis

Caryophyllaceae

Lychnis drummondii

Chenopodiaceae

Chenopodium capitatum
Chenopodium glaucum
Chenopodium rubrum
Corispermum nitidum
Corispermum hyssopifolium
Kochia scoparia

Compositae (Asteraceae)

Aster brachyactis
Aster hesperius
Aster pauciflorus
Bahia dissecta
Cirsium parryi
Eupatorium herbaceum
Packera werneriifolia = *Senecio w.*
Sonchus oleraceus

Crucifereae (Brassicaceae)

Rorippa sphaerocarpa

Cyperaceae

Carex rossii
Eleocharis acicularis
Eleocharis palustris
Scirpus acutus = *Schoenoplectis lacustris* ssp. *acutis*
Scirpus microcarpus

Gentianaceae

Gentiana affinis
Gentianella acuta

Table 2(con't).--Species newly discovered in 1991 at Great Sand Dunes National Monument

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Graminaceae (Poaceae)

Alopecuris aequalis
Aristida purpurea
Calamagrostis canadensis
Glyceria grandis
Muhlenbergia andina
Puccinellia nuttalliana = *P. aeroides*
Sphenopholis obtusata

Juncaceae

Juncus tenuis

Juncaginaceae

Triglochin maritima
Triglochin palustris

Labiateae (Lamiaceae)

Prunella vulgaris
Scutellaria galericulata var. *epilobifolia*
Stachys palustris var. *pilosa*

Leguminosae (Fabaceae)

Glycyrrhiza lepidota

Lemnaceae

Lemna minor

Onagraceae

Gayophytum diffusum

Plantaginaceae

Plantago major

Polemoniaceae

Gilia leptomeria = *Ipomopsis l.*

Polygonaceae

Polygonum douglasii
Polygonum pennsylvanicum = *Persicaria p.*
Rumex maritumus ssp. *fueginus*

Table 2(con't).--Species newly discovered in 1991 at Great Sand Dunes National Monument

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Polypodiaceae = several families of Weber (1990) (Ferns)

Cheilanthes feei
Notholaena fendleri
Woodsia oregana

Primulaceae

Glaux maritima

Ranunculaceae

Delphinium robustum
Ranunculus scleratus

Scrophulariaceae

Veronica catena
Veronica peregrina ssp. *xalapensis*
Veronica serpyllifolia = *Veronicastrum s.* ssp. *humifusum*

Solanaceae

Solanum sarachoides = *S. physalifolium* var. *nitibaccatum*
Solanum physalifolium

Ulmaceae

Ulmus pumila

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Appendix A.--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Acer glabrum	1	ACE	S	NA	-	montane
Yucca glauca	16	AGAV	S	NA	-	valley, plains
Amaranthus graceizans	0	AMAR	AF	NA	weedy	disturbance
Amaranthus retroflexus	0	AMAR	AF	CA	weedy	disturbance
Rhus trilobata	7	ANA	S	NA	-	riparian, lower montain
Cymopterus acaulis	1	API	PF	NA	-	lower montane
Heracleum lanatum	2	API	PF	NA,E	-	moist montane, riparian
Ligusticum porteri	3	API	PF	NA	-	riparian, montane
Oreoxis alpina	0	API	PF	NA	-	montane
Osmorhiza depauperata	1	API	PF	NA,SA	-	montane
Oxypolis fendleri	1	API	PF	NA	-	riparian
Apocynum androsaemifolium	0	APOC	PF	NA	-	montane
Ascelepias speciosa	1	ASCL	PF	NA	m.early	moister disturbance
Achillea lanulosa	7	AST	PF	CB	-	montane
Ambrosia acanthicarpa	15	AST	AF	NA	weedy	valley, sand
Antennaria parvifolia	0	AST	PF	NA	-	montane
Antennaria rosea	4	AST	PF	NA	-	montane
Artemisia campestris	5	AST	PF	NA	-	montane
Artemisia carruthii	4	AST	PF	NA	-	montane
Artemisia dracunculus	6	AST	PF	NA,E	-	valley, lower montane
Artemisia franseroides	0	AST	PF	NA	-	montane
Artemisia frigida	22	AST	S	NA,E	-	montane
Artemisia tridentata	0	AST	S	NA	-	montane
Aster adscendens *	1	AST	PF	NA	-	montane
Aster brachyactis *	1	AST	AF	NA	m. early	saline marsh, lake
Aster chilensis	6	AST	PF	NA	-	montane
Aster hesperius	1	AST	PF	NA	-	riparian
Aster pauciflorus *	2	AST	PF	NA	-	saline marsh
Bahia dissecta	1	AST	BF	NA	m. early	lower montane
Bahia neomexicana	1	AST	PF	NA	m. early	valley
Bidens cernua *	1	AST	PF	NA,E	m. early	marsh
Brickellia grandiflora	1	AST	PF	NA	-	montane

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Chaenactis douglasii	1	AST	PF	NA	-	arid montane
Chrysothamnus nauseosus	49	AST	S	NA	m. early	valley
Chrysothamnus parryi	9	AST	S	NA	-	valley, montane
Chrysothamnus viscidiflorus	6	AST	S	NA	-	valley, montane
Cirsium arvense	2	AST	PF	E EXOTIC	weedy	moister disturbance
Cirsium canescens	1	AST	PF	NA	m. early	valley
Cirsium parryi	1	AST	PF	NA	m. early	meadow
Cirsium undulatum	15	AST	PF	NA	early	valley, sand
Conyza canadensis	3	AST	AF	NA,E	weedy	moister disturbance
Crepis acuminata	4	AST	PF	NA	-	meadow
Crepis runcinata	1	AST	PF	NA	-	meadow, riparian
Erigeron acris	2	AST	PF	CB	-	montane
Erigeron flagellaris	3	AST	BF	NA	-	montane
Erigeron lonchophyllus	3	AST	PF	NA	-	marsh
Erigeron speciosus	5	AST	PF	NA	-	montane
Erigeron subtrinervis	0	AST	PF	NA	-	montane
Erigeron vetensis	4	AST	PF	NA	-	montane
Eupatorium herbaceum	3	AST	PF	NA	-	montane
Gnaphalium grayi	0	AST	AF	NA	-	marsh
Grindelia squarrosa	0	AST	PF	NA	weedy	roadside
Gutierrezia sarothrae	1	AST	S	NA	early	desert, lower montane
Haplopappus parryi	0	AST	PF	NA	-	montane
Helianthus annuus	1	AST	AF	NA	weedy	valley, distrubance
Helianthus petiolaris	56	AST	AF	NA	early	valley
Heterotheca villosa	20	AST	PF	NA	-	valley, montane
Hymenopappus filifolius	2	AST	PF	NA	-	foothill
Hymenoxys acaulis	0	AST	PF	NA	-	valley, lower montane
Hymenoxys richardsonii	4	AST	PF	NA	-	montane
Iva xanthifolia	0	AST	PF	NA	weedy	valley, disturbance

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Lactuca tatarica *	6	AST	PF	CB	-	marsh
Lygodesmia juncea	37	AST	PF	NA	-	sand
Machaeranthera canescens	13	AST	BF	NA	-	montane
Packera werneriifolia	1	AST	PF	NA	-	montane
Rudbeckia hirta	1	AST	PF	NA	-	meadow
Rudbeckia laciniata	2	AST	PF	NA	-	riparian
Senecio eremophilus	2	AST	PF	NA	-	montane
Senecio fendleri	10	AST	PF	NA	-	lower montane
Senecio pudicus	2	AST	PF	NA	-	riparian, montane
Senecio sparteoides	47	AST	PF	NA	-	valley, lower montane
Senecio tridenticulatus	19	AST	PF	NA	-	lower montane
Solidago sparsiflora	5	AST	PF	NA	-	montane
Solidago spathulata	0	AST	PF	NA	-	montane
Sonchus arvensis *	1	AST	PF	E EXOTIC	weedy	meadow, moister disturbance
Sonchus oleraceus	0	AST	AF	E EXOTIC	weedy	moister disturbance
Stephanomeria pauciflora	0	AST	PF	NA	-	valley, sand
Taraxacum officinale	10	AST	PF	E EXOTIC	m. early	meadow
Tetradymia canescens	2	AST	S	NA	-	montane
Townsendia exscapa	0	AST	PF	NA	-	montane
Tragopogon dubius	3	AST	BF	E EXOTIC	weedy	disturbance, ruderal
Verbesina encelioides	0	AST	AF	NA	-	valley, lower montane
Viguiera multiflora	0	AST	PF	NA	-	riparian, montane
Alnus tenuifolia	6	BET	S	NA	-	riparian
Cryptantha fendleri	18	BOR	AF	NA	early	valley
Cryptantha jamesii	13	BOR	PF	NA	-	sand, lower montane
Hackelia floribunda	4	BOR	PF	NA	-	riparian, montane
Lappula redowskii	6	BOR	AF	NA	early	montane
Lithospermum incisum	9	BOR	PF	NA	-	lower montane
Lithospermum multiflorum	0	BOR	PF	NA	-	valley, lower montane
Mertensia alpina	0	BOR	PF	NA	-	montane
Mertensia ciliata	3	BOR	PF	NA	-	riparian, montane
Mertensia lanceolata	1	BOR	PF	NA	-	montane

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Arabis drummondii	1	BRA	PF	NA	-	montane
Arabis hirsuta	2	BRA	PF	NA	-	montane
Arabis hoelboellii	7	BRA	PF	NA	-	montane
Arabis lignifera	8	BRA	PF	NA	-	montane
Cardamine cordifolia	2	BRA	PF	NA	-	riparian
Descurainia pinnata	9	BRA	AF	NA	early	valley
Descurainia richardsonii	34	BRA	AF	NA	early	montane
Draba aurea	0	BRA	PF	NA	-	montane
Draba lanceolata	1	BRA	PF	MA	-	montane
Erysimum asperum	28	BRA	BF	NA	-	montane
Erysimum inconspicuum	0	BRA	BF	NA	-	montane
Lepidium montanum	1	BRA	PF	NA	-	lower montane
Lesquerella montana	4	BRA	PF	NA	-	mopntane
Rorippa sphaerocarpa	0	BRA	AF	NA	-	riparian
Echinocereus triglochidiatus	1	CACT	C	NA	-	lower montane
Echinocereus viridiflorus	0	CACT	C	NA	-	valley
Opuntia polyacantha	25	CACT	C	NA	-	valley
Pediocactus simpsonii	0	CACT	C	NA	-	valley, montane
Campanula parryi	1	CAMP	PF	NA	-	moist montane
Campanula rotundifolia	0	CAMP	PF	NA,E	-	montane
Humulus lupus	1	CANN	PF	E EXOTIC	-	riparian
Cleome multicaulis *	2	CAPP	AF	NA	-	saline marsh
Cleome serrulata	1	CAPP	AF	NA	m. early	valley, disturbance
Lonicera involucrata	1	CAPR	S	NA	-	riparian, montane
Sambucus microbotrys	0	CAPR	S	NA	-	lower montane, riparian
Symphoricarpos oreophilus	22	CAPR	S	NA	-	montane
Symphoricarpos rotundifolius	0	CAPR	S	NA	-	montane
Arenaria fendleri	1	CARY	PF	NA	-	lower montane, sand
Cerastium arvense	1	CARY	PF	NA,E	early	meadow
Cerastium nutans	1	CARY	AF	NA	m. early	moist meadow, riparian
Lychnis drummondii	1	CARY	PF	NA	-	montane

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Stellaria longifolia	1	CARY	PF	NA	-	riparian, meadow
Ceratophyllum demersum *	0	CERAT	AF	COSM	-	pond
Atriplex canescens	0	CHEN	S	NA	-	valley
Ceratoides lanata	4	CHEN	S	NA	-	desert, lower montane
Chenopodium capitatum	0	CHEN	AF	NA	-	montane
Chenopodium fremontii	10	CHEN	AF	NA	m. early	lower montane
Chenopodium glaucum *	1	CHEN	AF	NA,E	-	saline marsh
Chenopodium leptophyllum	42	CHEN	AF	NA	m. early	lower montane
Chenopodium rubrum *	0	CHEN	AF	NA,E	-	saline marsh
Corispermum nitidum	28	CHEN	AF	NA,E	early	sand
Cycloloma atriplicifolia	5	CHEN	AF	NA,E	early	sand
Kochia scoparia	1	CHEN	AF	E EXOTIC	weedy	saline disturbance
Salsola kali	13	CHEN	AF	E EXOTIC	invasive	arid disturbance
Sarcobatus vermiculatus *	0	CHEN	S	NA	-	saline valley
Suaeda calceoliformis *	2	CHEN	AF	NA	-	saline meadow
Convolvulus arvensis	0	CONV	PF	E EXOTIC	invasive	valley, ruderal
Cornus stolonifera	0	CORN	S	NA	-	riparian
Sedum lanceolatum	0	CRASS	PF	NA	-	montane
Juniperus communis	1	CUP	S	CB	-	montane
Juniperus scopulorum	19	CUP	T	NA	-	montane
Carex	7	CYP	PG	-	-	riparian, palustrine
Carex douglasii *	1	CYP	PG	NA	-	moist montane
Carex interior	0	CYP	PG	NA	-	marsh, meadow
Carex nebrascensis *	2	CYP	PG	NA	-	riparian, palustrine
Carex pennsylvanica	1	CYP	PG	NA	-	lower montane
Carex rossii	13	CYP	PG	NA	-	montane
Carex stenophylla	2	CYP	PG	NA	-	montane
Cyperus aristatus *	0	CYP	AG	COSM	early	marsh, disturbance
Eleocharis acicularis *	1	CYP	PG	NA,SA,E	-	riparian, palustrine
Eleocharis palustris *	1	CYP	PG	NA,E	-	riparian, palustrine

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Scirpus acutus *	1	CYP	PG	NA	-	marsh
Scirpus americanus *	1	CYP	PG	NA,SA	-	marsh
Scirpus microcarpus *	0	CYP	PG	NA	-	riparian
Scirpus nevadensis *	3	CYP	PG	NA,SA	-	saline meadow
Equisetum arvense	6	EQU	PF	CB	-	riparian, moist meadow
Equisetum laevigatum	5	EQU	PF	NA	-	riparian, moist meadow
Euphorbia glyptosperma	1	EUPH	AF	NA	weedy	disturbance
Euphorbia robusta	5	EUPH	PF	NA	-	lower montane
Euphorbia serpyllifolia	0	EUPH	AF	NA	early	valley, lower montane
Astragalus agrestis	0	FAB	PF	NA	-	valley
Astragalus ceramicus	5	FAB	PF	NA	-	sand
Astragalus parryi	1	FAB	PF	NA	-	montane
Glycirrhiza lepidota	1	FAB	PF	NA	m. weedy	marsh, moist meadow
Lupinus pusillus	4	FAB	AF	NA	m. early	valley, lower montane
Melilotus albus	0	FAB	AF	E EXOTIC	weedy	disturbance
Melilotus officinale	1	FAB	AF	E EXOTIC	weedy	disturbance
Oxytropis deflexa	0	FAB	PF	E,NA	-	montane
Oxytropis sericea	2	FAB	PF	NA	-	valley, lower montane
Psoralea lanceolata	60	FAB	PF	NA	-	sand
Thermopsis montana	4	FAB	PF	NA	-	readow, riparian
Trifolium praetense	0	FAB	PF	E EXOTIC	-	meadow
Trifolium repens	2	FAB	PF	E EXOTIC	-	meadow
Vicia americana	1	FAB	PF	NA	-	riparian, montane
Corydalis aurea	2	FUM	AF	NA	-	montane
Gentiana affinis	1	GEN	PF	NA	-	meadow, riparian
Gentianella acutus	0	GEN	PF	NA	-	moist meadow
Erodium cicutarium	0	GER	AF	E EXOTIC	invasive	valley
Geranium caespitosum	1	GER	PF	NA	-	montane
Geranium richardsonii	4	GER	PF	NA	-	montane
Myriophyllum exalbescens *	0	HAL	AF	NA	-	lake and pond
Hydrophyllum fendleri	0	HYD	PF	NA	-	lower montane

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Phacelia alba	1	HYD	PF	NA	-	lower montane
Iris missouriensis	0	IRID	PF	NA	-	moist meadow
Juncus balticus *	11	JUN	PG	CB	-	saline marsh, meadow
Juncus bufonius	1	JUN	PG	COSM	-	riparian
Juncus ensifolius *	2	JUN	PG	NA	-	palustrine, riparian
Juncus tenuis *	0	JUN	PG	NA	-	riparian
Triglochin maritima *	0	JUNCAG	PG	CB	-	wet meadow
Triglochin palustris *	0	JUNCAG	PG	CB	-	wet meadow
Mentha arvensis	5	LAM	PF	CB	-	riparian
Monarda pectinata	0	LAM	PF	NA	-	valley, lower montane
Prunella vulgaris	0	LAM	PF	E,NA	-	riparian, wet meadow
Scutellaria galericulata	0	LAM	PF	NA	-	riparian, wet meadow
Stachys palustris	0	LAM	PF	CB	-	riparian
Lemna minor *	1	LEM	AF	COSM	-	pond
Allium cernuum	4	LIL	PF	NA	-	montane
Smilacina racemosa	0	LIL	PF	NA	-	riparian, montane
Smilacina stellata	6	LIL	PF	NA	-	moist montane
Linum lewisii	0	LIN	PF	E,NA	-	montane
Mentzelia albicaulis	1	LOA	AF	NA	-	valley, lower montane
Mentzelia multiflora	1	LOA	PF	NA	-	valley, lower montane
Sidalcea candida	0	MALV	PF	NA	-	riparian, montane
Sphaeralcea coccinea	3	MALV	PF	NA	-	valley
Mirabilis multiflora	0	NYCT	PF	NA	-	valley, lower montane
Mirabilis oxybaphoides	1	NYCT	PF	NA	-	lower montane
Oxybaphus linearus	1	NYCT	PF	NA	-	valley, lower montane
Tripterocalyx micranthus	2	NYCT	AF	NA	-	valley, sand
Epilobium angustifolium	0	ONA	PF	NA	early	montane
Epilobium glandulosum *	6	ONA	PF	NA,E	-	riparian, palustrine
Epilobium hornemannii	0	ONA	PF	CB	-	riparian, montane
Epilobium lactiflorum	0	ONA	PF	CB	-	riparian, montane
Gayophytum diffusum	5	ONA	AF	NA	-	lower montane

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Guara coccinea	0	ONA	PF	NA	-	lower montane
Oenothera albicaulis	0	ONA	AF	NA	-	valley, lower montane
Oeonthera caespitosa	1	ONA	PF	NA	-	lower montane
Oenothera coronopifolia	28	ONA	PF	NA	-	lower montane
Oenothera pallida	1	ONA	PF	NA	-	valley, lower montane
Oenothera strigosa	1	ONA	PF	NA	-	valley
Corallorhiza maculata	0	ORCH	PF	NA,CA	-	montane
Corallorhiza striata	0	ORCH	PF	NA	-	montane
Habenaria hyperborea	2	ORCH	PF	NA,GR	-	riparian, montane
Orobanche multiflora	5	ORO	PF	NA	-	sand
Abies concolor	8	PIN	T	NA	-	montane
Pinus edulis	13	PIN	T	NA	-	lower montane
Pinus flexilis	3	PIN	T	NA	-	upper montane
Pinus ponderosa	4	PIN	T	NA	-	lower montane
Psuedotsuga menzeiesii	9	PIN	T	NA	-	montane
Plantago major	1	PLA	PF	E EXOTIC	weedy	ruderal, moist disturbance
Agropyron intermedium	1	POA	PG	E EXOTIC	-	montane
Agropyron repens	1	POA	PG	E EXOTIC	weedy	ruderal
Agropyron smithii *	14	POA	PG	NA	-	valley, lower montane
Agropyron trachycaulum	6	POA	PG	NA,E	-	meadow, montane
Agrostis scabra	4	POA	PG	NA,E	-	riparian
Agrostis stolonifera *	6	POA	PG	E EXOTIC	-	riparian
Alopecuris aequalis *	1	POA	PG	NA,SA,E	-	riparian
Andropogon gerardii	0	POA	PG	NA	-	valley
Aristida purpurea	2	POA	PG	NA	-	desert, lower montane
Bouteloua curtipendula	0	POA	PG	NA,SA	-	lower montane
Bouteloua gracilis	19	POA	PG	NA	-	valley, lower montane
Bromus anomalus	10	POA	PG	NA	-	moist meadow, montane
Bromus ciliatus	3	POA	PG	NA	-	moist meadow, montane
Bromus tectorum	2	POA	AG	E EXOTIC	invasive	arid disturbance
Calamagrostis canadensis	2	POA	PG	CB	-	moist meadow, montane
Calamagrostis stricta	0	POA	PG	CB,SA	-	riparian, montane

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Calamovilfa longifolia	1	POA	PG	NA	-	sand
Dactylis glomerata	0	POA	PG	E,AF	-	montane, ruderal
Distichlis spicata *	2	POA	PG	NA,SA	-	saline meadow
Festuca ovina	13	POA	PG	NA,SA,E	-	montane
Glyceria grandis *	0	POA	PG	NA	-	marsh
Hordeum jubatum *	4	POA	PG	NA,E	weedy	ruderal, disturbance
Koeleria nitida	6	POA	PG	NA,E	-	lower montane
Muhlenbergia andina	1	POA	PG	NA	-	riparian
Muhlenbergia asperifolia *	6	POA	PG	NA,SA	-	saline marsh, disturbance
Muhlenbergia montana	11	POA	PG	NA	-	montane
Muhlenbergia pungens	14	POA	PG	NA	-	valley
Munroa squarrosa	0	POA	AG	NA	early	valley, lower montane
Oryzopsis hymenoides	56	POA	PG	NA,SA	-	valley, lower montane
Oryzopsis micrantha	10	POA	PG	NA	-	montane
Phleum praetense	0	POA	PG	E	-	riparian, montane
Poa fendleriana	12	POA	PG	NA	-	montane
Poa pattersonii	0	POA	PG	NA	-	upper montane
Poa praetense	10	POA	PG	E EXOTIC	-	riparian, moist montane
Puccinellia nuttalliana *	3	POA	PG	NA	-	saline marsh
Redfieldia flexuosa	61	POA	PG	NA	early	sand
Sitanion hystrix	15	POA	PG	NA	-	desert, montane
Sphenopholis obtusata *	1	POA	AG	NA	-	riparian, palustrine
Sporobolus airoides	0	POA	PG	NA	-	valley
Sporobolus cryptandrus	31	POA	PG	NA	-	valley, sand
Stipa comata	30	POA	PG	NA	-	valley, lower montane
Stipa pinetorum	1	POA	PG	NA	-	lower montane
Trisetum spicatum	0	POA	PG	CB,SA	-	montane
Gilia (annual)	1	POLE	AF	NA	-	valley
Gilia aggregata	9	POLE	PF	NA	-	lower montane
Gilia leptomeria	0	POLE	AF	NA	-	desert, lower montane
Gilia longiflora	5	POLE	PF	NA	-	sand, lower montane
Gilia pinnatifida	6	POLE	PF	NA	-	lower montane

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Leptodactylon pungens	1	POLE	PF	NA	-	montane
Polemonium foliosissimum	0	POLE	PF	NA	-	montane
Eriogonum alatum	1	POLY	PF	NA	-	sand, lower montane
Eriogonum cernuum	10	POLY	AF	NA	m. early	valley, lower montane
Eriogonum effusum	0	POLY	PF	NA	-	valley, lower montane
Eriogonum jamesii	12	POLY	PF	NA	-	montane
Polygonum amphibium *	1	POLY	PF	COSM	-	aquatic, riparian
Polygonum aviculare	1	POLY	PF	COSM	weedy	disturbance
Polygonum douglasii	4	POLY	AF	NA	early	montane, disturbance
Polygonum pennsylvanicum	0	POLY	AF	E EXOTIC	-	palustrine, riparian
Rumex acetosella	1	POLY	PF	E EXOTIC	early	wetland, disturbance
Rumex maritumus *	0	POLY	AF	E,NA,SA	-	marsh
Rumex venosus	1	POLY	PF	NA	-	valley, sand
Cheilanthes feei	0	POLYP	PF	NA	-	montane, rock
Notholaena fendleri	0	POLYP	PF	NA	-	montane, arid rock
Woodsia oregana	1	POLYP	PF	NA	-	shady montane
Portulaca oleracea	3	PORT	AF	COSM	weedy	moister disturbance
Sedum lanceolatum	2	PORT	PF	NA	-	montane
Potamogeton foliosus *	0	POT	AF	NA	-	pond
Androsace septentrionalis	11	PRIM	AF	CB	-	montane
Dodecatheon pulchellum	0	PRIM	PF	NA	-	moist montane
Glaux maritima *	0	PRIM	PF	CB	-	riparian, saline marsh
Pyrola secunda	0	PYR	PF	NA,E	-	montane
Clematis columbiana	3	RAN	V	NA	-	montane
Clematis hirsutissima	0	RAN	PF	NA	-	montane
Clematis ligusticifolia	0	RAN	V	NA	-	riparian
Delphinium robustus	0	RAN	PF	NA	-	montane
Ranunculus cymbalaria *	4	RAN	PF	NA,SA,E	-	palustrine, riparian
Ranunculus scleratus *	1	RAN	AF	NA	-	aquatic, riparian
Thalictrum fendleri	2	RAN	PF	NA	-	moist montane

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Amelanchier alnifolia	1	ROS	S	NA	-	riparian, montane
Cercocarpus montanus	10	ROS	S	NA	-	montane
Crateagus rivularis	1	ROS	S	NA	-	riparian
Fallugia paradoxa	0	ROS	S	NA	-	desert, lower montane
Fragaria vesca	0	ROS	PF	NA	-	riparian, montane
Geum macrophyllum	1	ROS	PF	NA,E	-	riparian, moist montane
Holodiscus dumosus	10	ROS	S	NA	-	montane, rock
Physocarpus monogynus	1	ROS	S	NA	-	montane
Potentilla ambigens	0	ROS	PF	NA	-	montane
Potentilla anserina *	3	ROS	PF	CB	-	marsh
Potentilla biennis	0	ROS	AF	NA	-	riparian
Potentilla fruticosa	1	ROS	S	NA,E	-	meadow, moist montane
Potentilla gracilis	1	ROS	PF	NA	-	moist montane
Potentilla norvegica *	1	ROS	PF	NA,E	-	plaustrine, meadow
Potentilla pennsylvanica	1	ROS	PF	NA	-	meadow, montane
Potentilla plattensis *	0	ROS	PF	NA	-	riparian
Prunus virginiana	4	ROS	S	NA	-	montane
Rosa acicularis	0	ROS	S	NA	-	valley, montane
Rosa woodsii	9	ROS	S	NA	-	riparian, montane
Rubus deliciosus	1	ROS	S	NA	-	canyon
Rubus idaeus	3	ROS	S	NA,E	-	riparian, montane
Galium boreale	2	RUB	PF	CB	-	montane
Populus angustifolia	10	SAL	T	NA	-	riparian
Populus tremuloides	6	SAL	T	NA	-	montane
Salix bebbiana	2	SAL	S	NA	-	riparian
Salix drummondiana	0	SAL	S	NA	-	riparian
Salix exigua *	8	SAL	S	NA	-	riparian
Salix lasiandra	0	SAL	S	NA	-	riparian
Salix psuedomonticola	0	SAL	S	NA	-	riparian

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Comandra umbellata	2	SANT	PF	NA	-	lower montane
Heuchera parvifolia	4	SAX	PF	NA	-	montane
Jamesia americana	2	SAX	S	NA	-	montane, rock
Ribes aureum	6	SAX	S	NA	-	riparian, lower montane
Ribes cereum	10	SAX	S	NA	-	montane
Ribes leptanthum	9	SAX	S	NA	-	lower montane
Saxifraga bronchialis	2	SAX	PF	NA	-	montane
Castilleja integra	0	SCR	PF	NA	-	valley, lower montane
Castilleja linariifolia	4	SCR	PF	NA	-	montane
Mimulus floribundus	1	SCR	AF	NA	-	moist montane
Mimulus glabratus	0	SCR	PF	NA,SA	-	riparian
Orthocarpus luteus *	1	SCR	AF	NA	M. EARLY	meadow, montane
Penstemon	1	SCR	PF	NA	-	-
Penstemon angustifolius	11	SCR	PF	NA	-	sand
Penstemon barbatus	6	SCR	PF	NA	-	lower montane
Penstemon comarrhenus	1	SCR	PF	NA	-	montane
Penstemon crandallii	3	SCR	PF	NA	-	valley, lower montane
Penstemon secundiflorus	0	SCR	PF	NA	-	lower montane
Penstemon virgatus	0	SCR	PF	NA	-	montane
Scrophularia lanceolata	2	SCR	PF	NA	-	montane
Veronica catenata *	0	SCR	PF	NA	-	marsh, lake
Veronica peregrina *	0	SCR	AF	NA,SA	-	riparian
Veronica serpyllifolia	0	SCR	PF	E,NA,SA	-	riparian, meadow
Verbascum thapsis	0	SCR	BF	E EXOTIC	weedy	valley, disturbance
Selaginella densa	4	SEL	PF	NA	-	montane
Solanum sarachoides	0	SOL	AF	SA EXOTIC	weedy	valley
Solanum physalifolium	0	SOL	AF	E EXOTIC	weedy	valley
Solanum triflorum	0	SOL	AF	NA	-	desert, lower montane
Typha latifolia *	2	TYPH	PF	NA,E,A	-	aquatic, palustrine

Appendix A (con't).--Species list with plant-water relationships for Great Sand Dunes National Monument

Species	Number of plots	Family	Life form	Origin	Earlier successional	Habitat
Ulmus pumila	0	ULM	T	E EXOTIC	weedy	urban, riparian
Urtica dioica	3	URT	PF	NA	-	riparian, montane
Valeriana capitata	1	VAL	PF	NA	-	moist montane
Verbena bracteata	0	VERB	AF	NA	weedy	roadside, disturbance
Viola canadensis	0	VIOL	PF	NA	-	moist montane

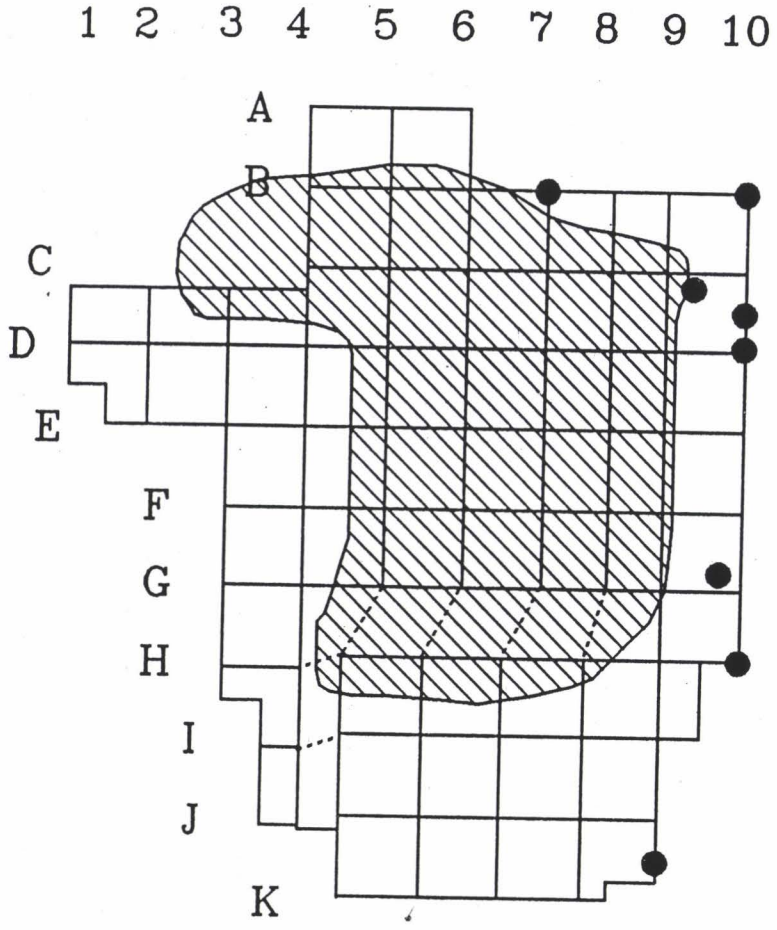
Notes to Appendix 1

* Wetland species which would be reduced or eliminated by lowering of water tables west of the dunes.

AF= ANNUAL FORB
PF= PERENNIAL FORB
AG= ANNUAL GRASS
PG= PERENNIAL GRASS OR GRAMINOID
C= CACTUS
S= SHRUB
T= TREE

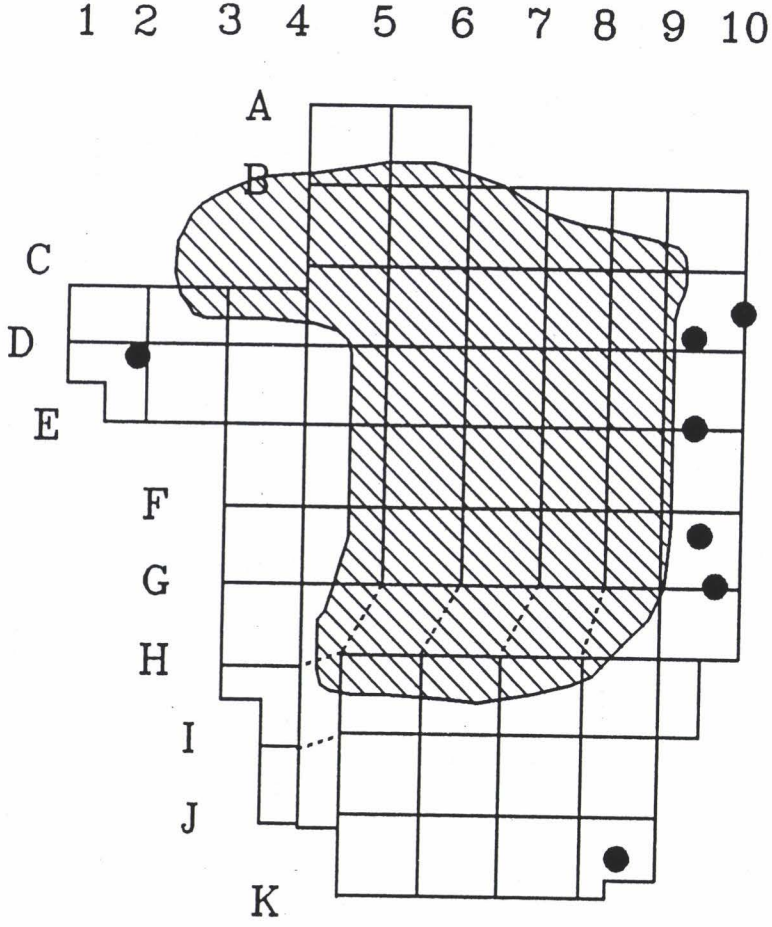
CA= CENTRAL AMERICAN
NA= NORTH AMERICA
SA= SOUTH AMERICA
E= EURASIA
A= AFRICA
GR= GREENLAND
CB= CIRCUMBOREAL
COSM= COSMOPOLITAN
E EXOTIC= ADVENTIVE FROM EURASIA

Appendix B.--Species plot distribution maps for species that occurred in at least six plots.



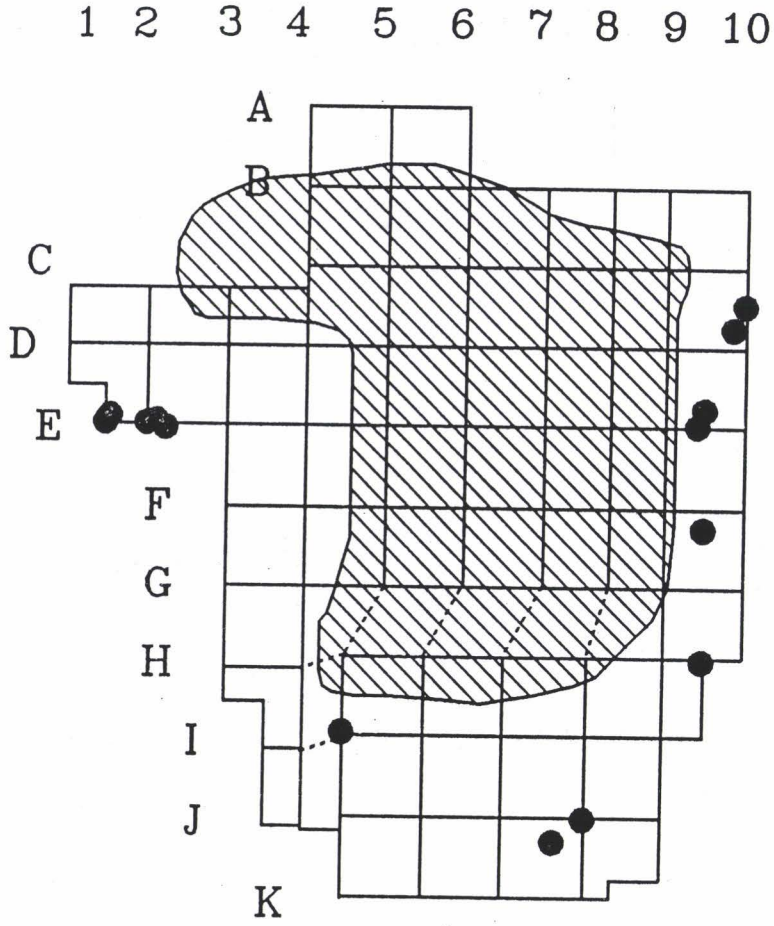
Abies concolor

Vegetation Survey Plots, 1991



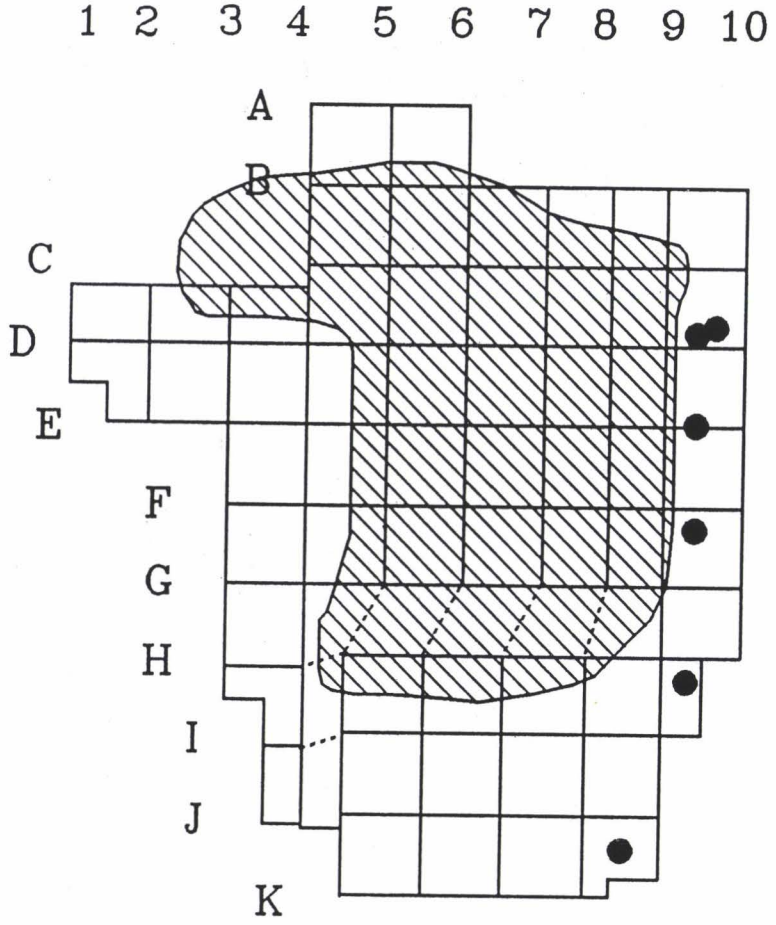
Achillea lanulosa

Vegetation Survey Plots, 1991



Agropyron smithii

Vegetation Survey Plots, 1991



Agropyron trachycaulum

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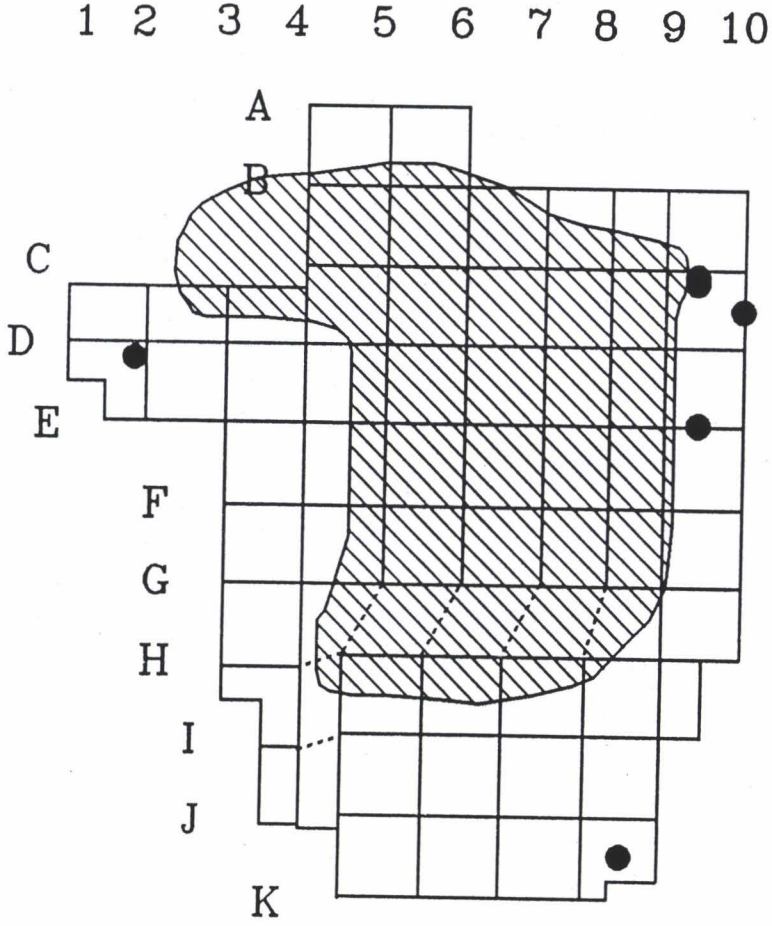
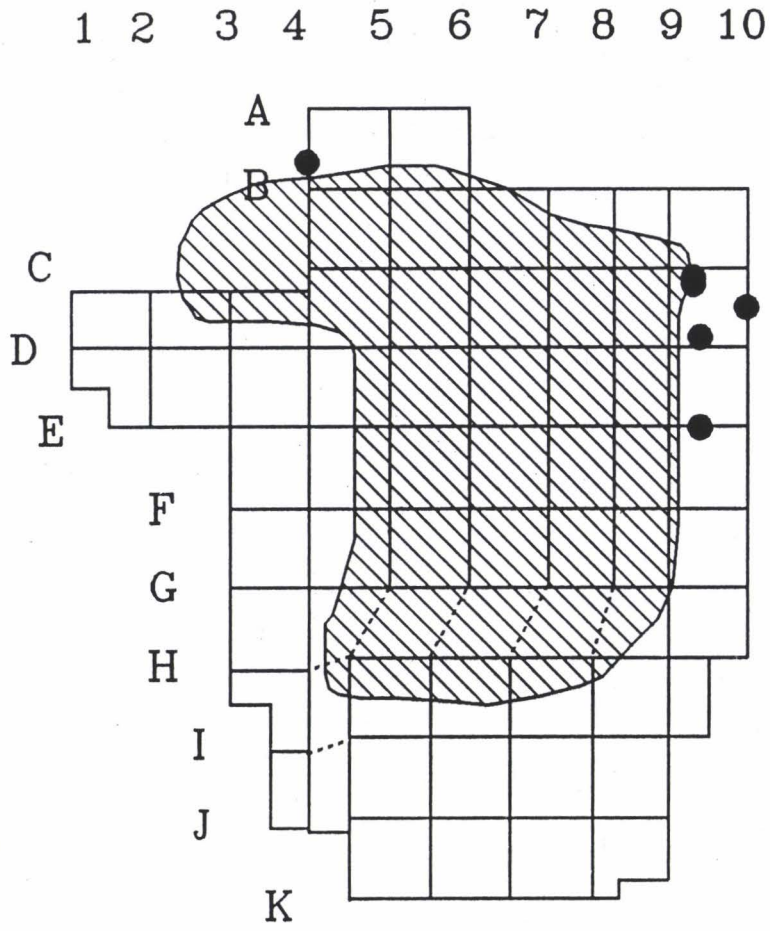


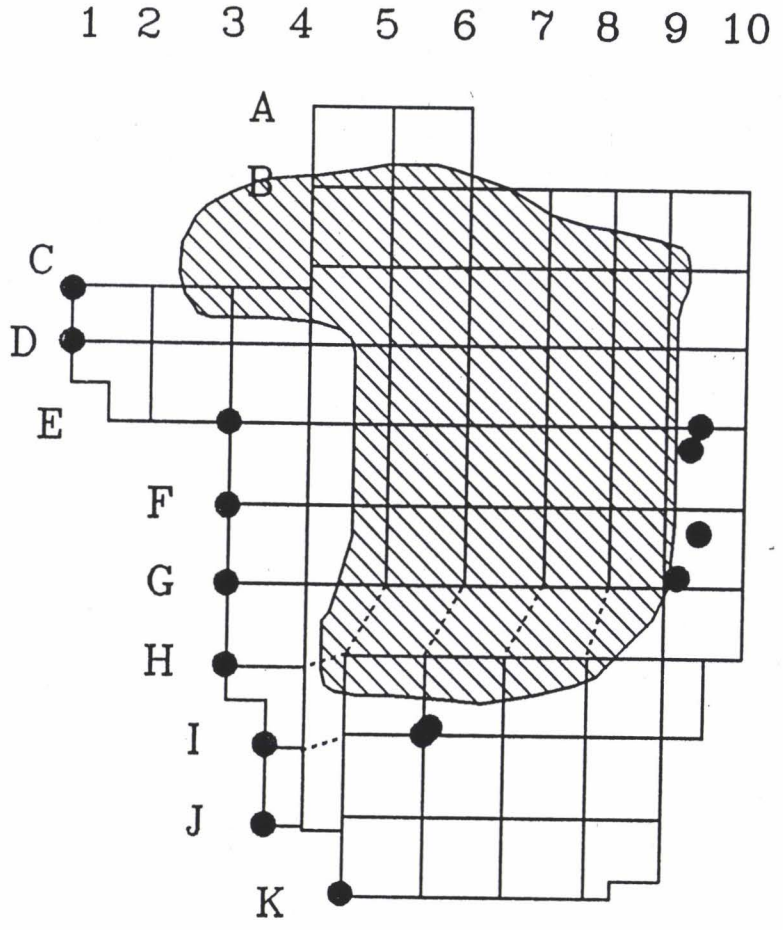
Agrostis stolonifera

Vegetation Survey Plots, 1991



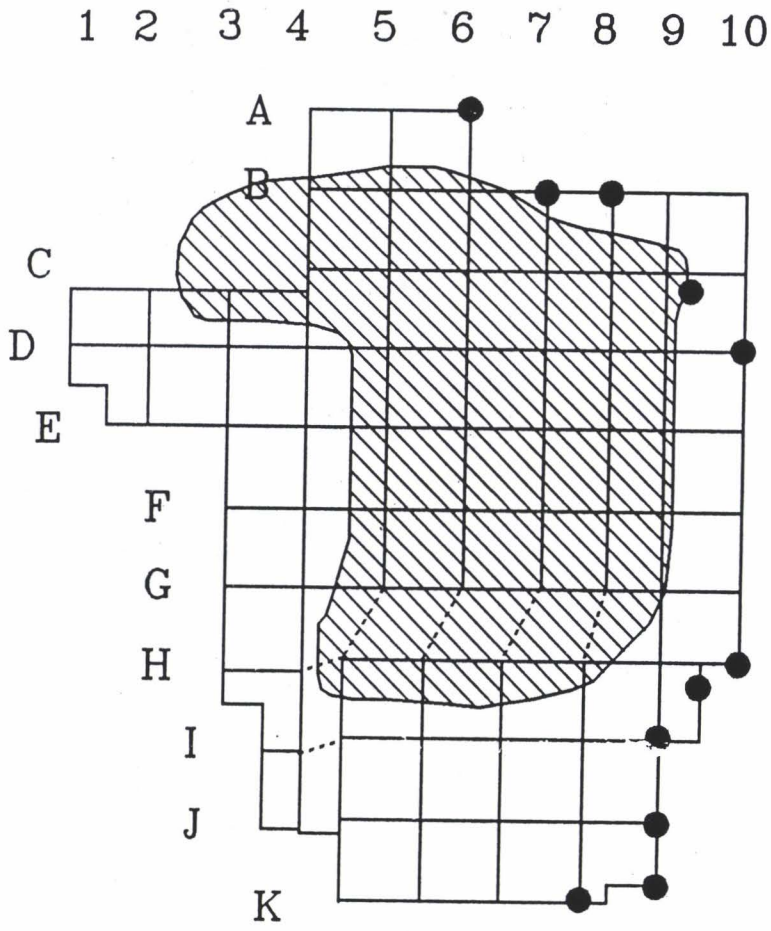
Alnus tenuifolia

Vegetation Survey Plots, 1991



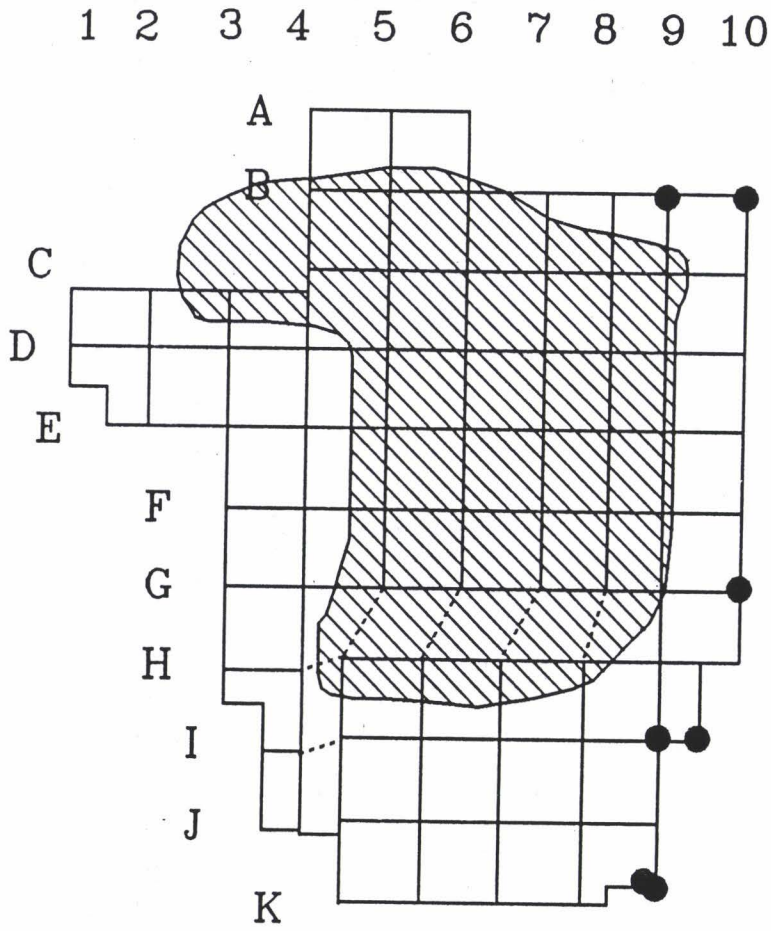
Ambrosia acanthicarpa

Vegetation Survey Plots, 1991



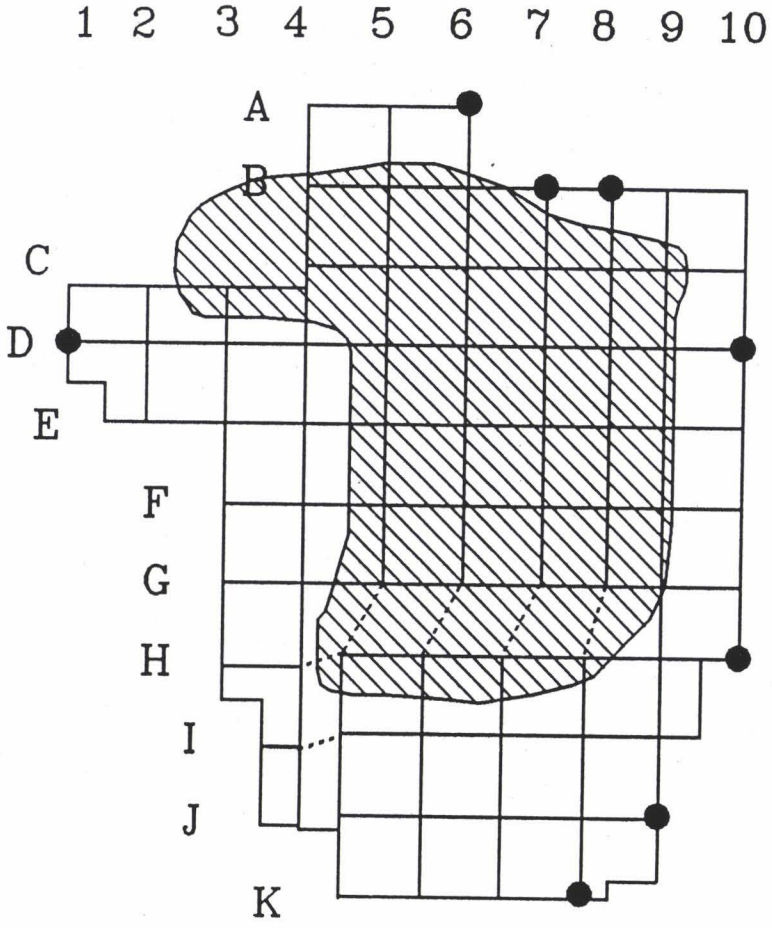
Androsace septentrionalis

Vegetation Survey Plots, 1991



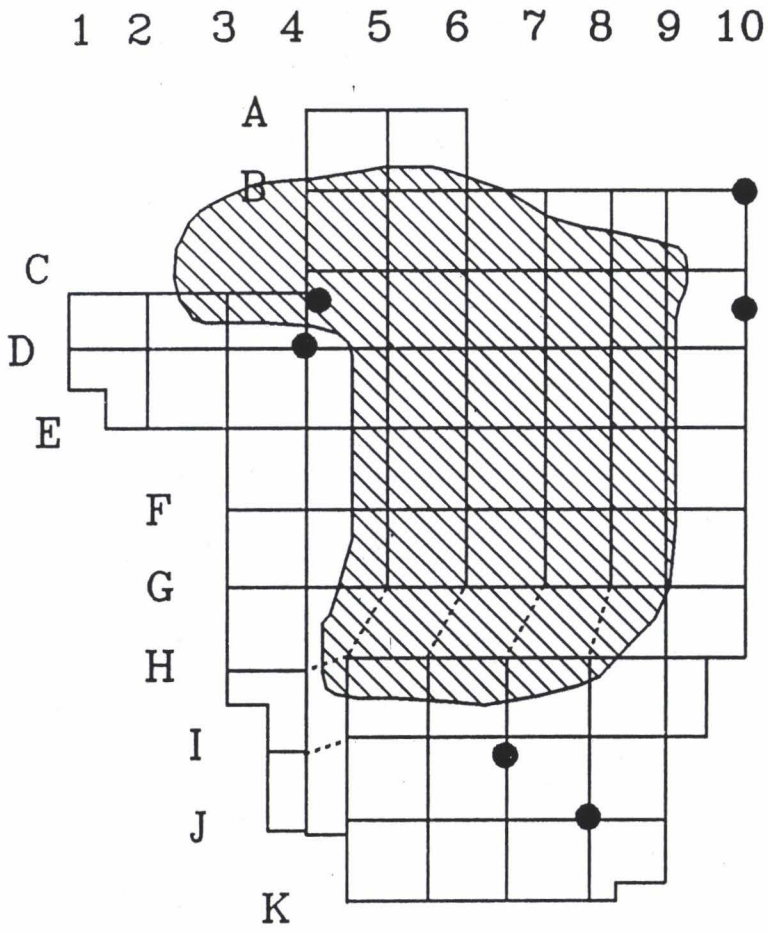
Arabis hoelboelii

Vegetation Survey Plots, 1991



Arabis lignifera

Vegetation Survey Plots, 1991



Artemisia dracunculus

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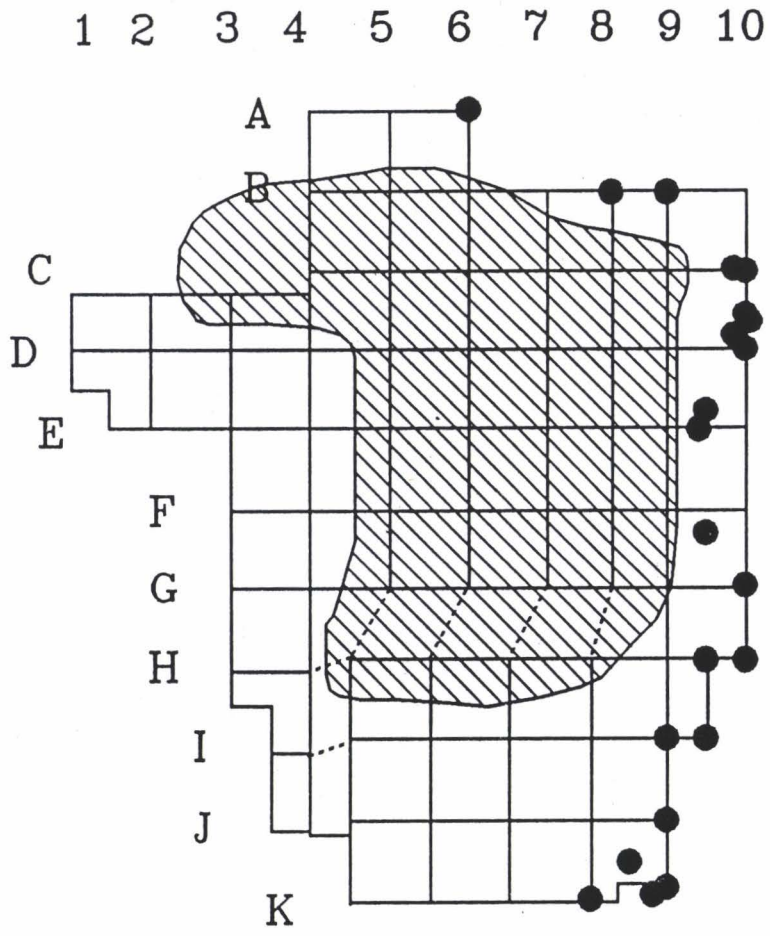
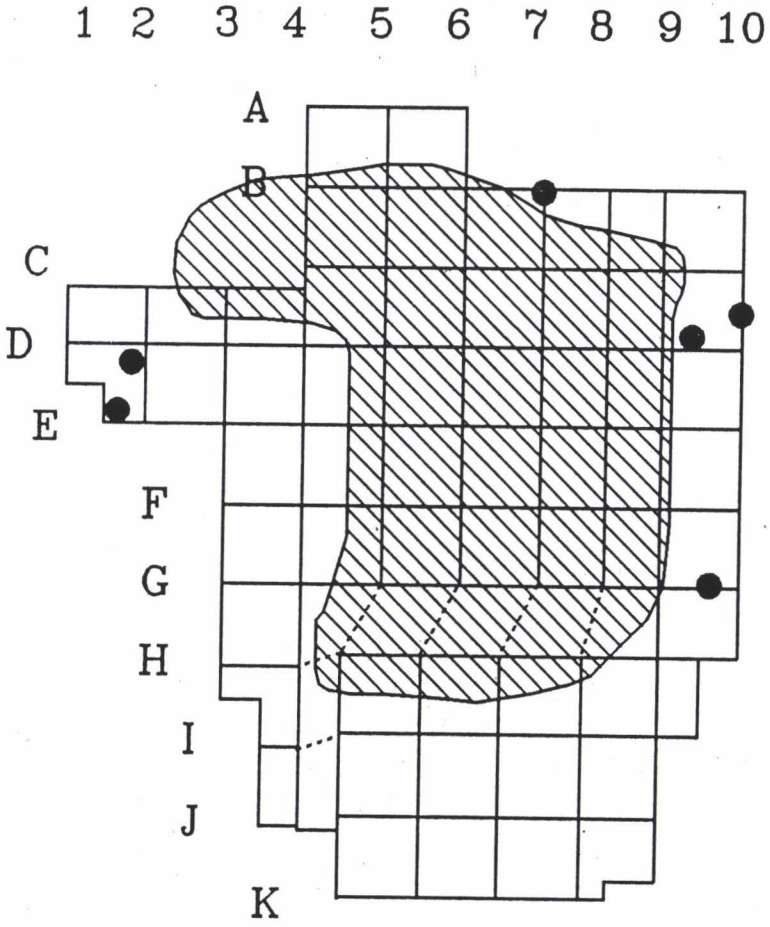


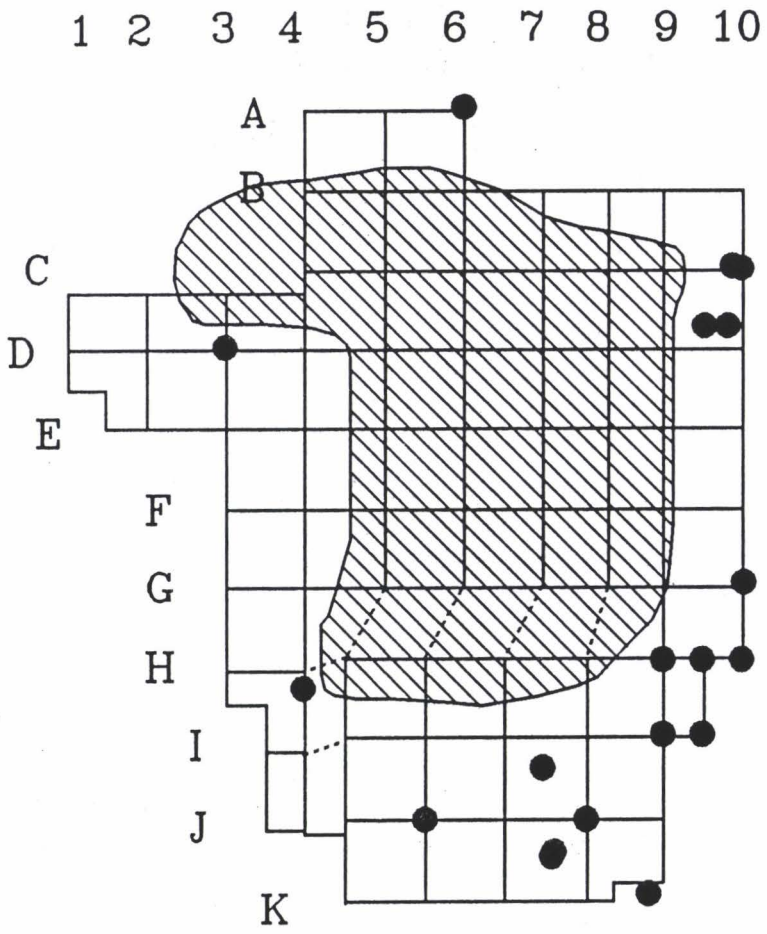
Artemesia frigida

Vegetation Survey Plots, 1991



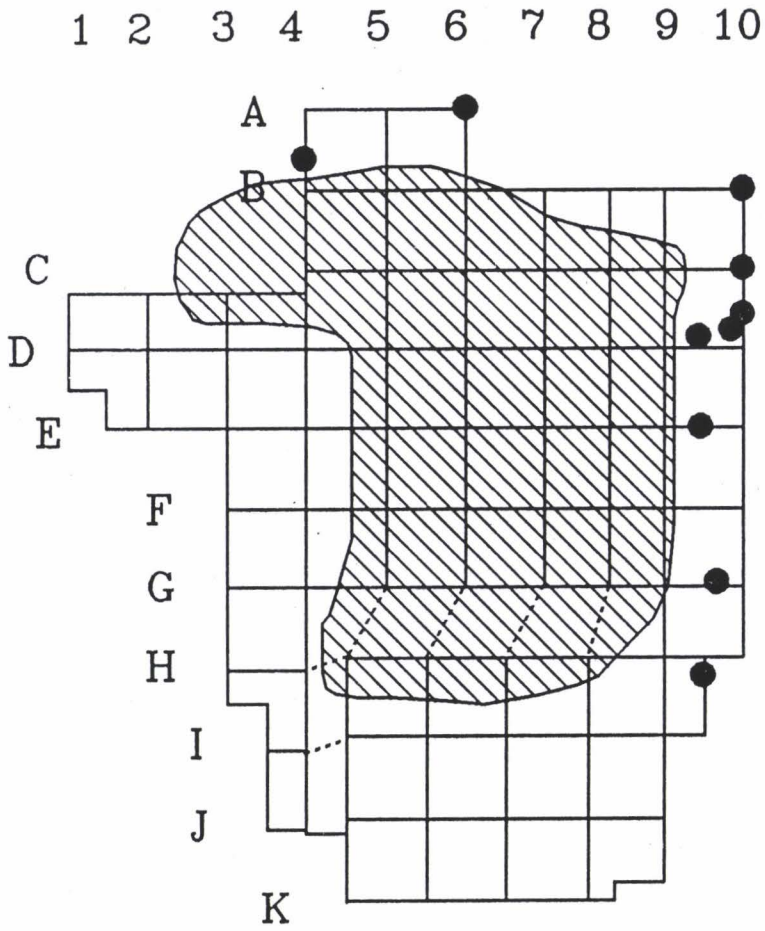
Aster chilensis

Vegetation Survey Plots, 1991



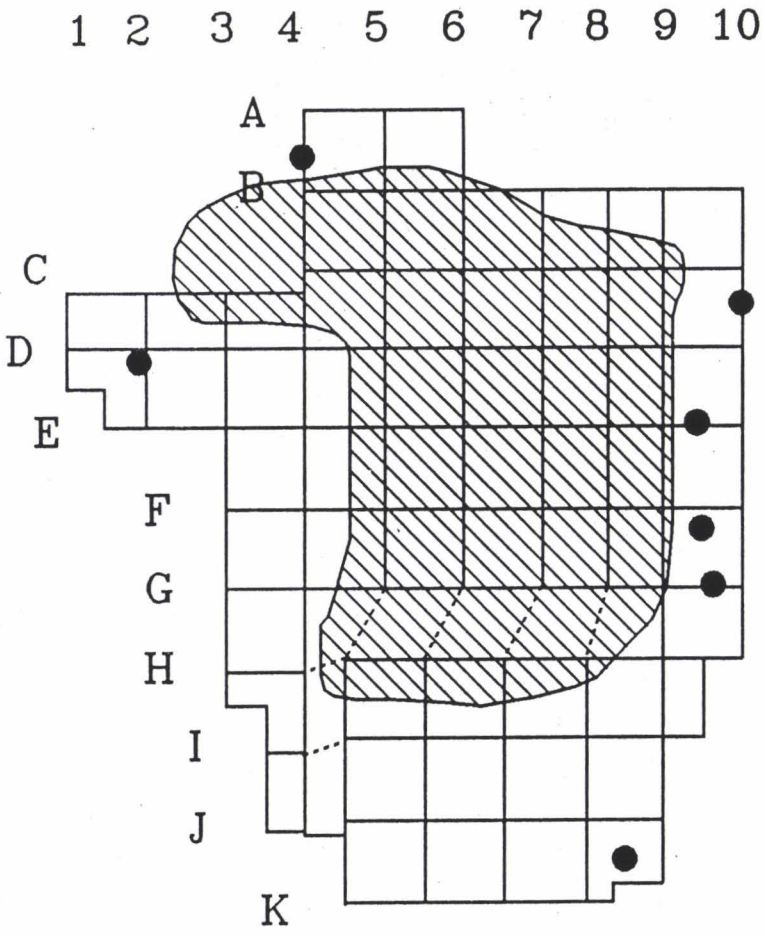
Bouteloua gracilis

Vegetation Survey Plots, 1991



Bromus anomalus

Vegetation Survey Plots, 1991



Carex

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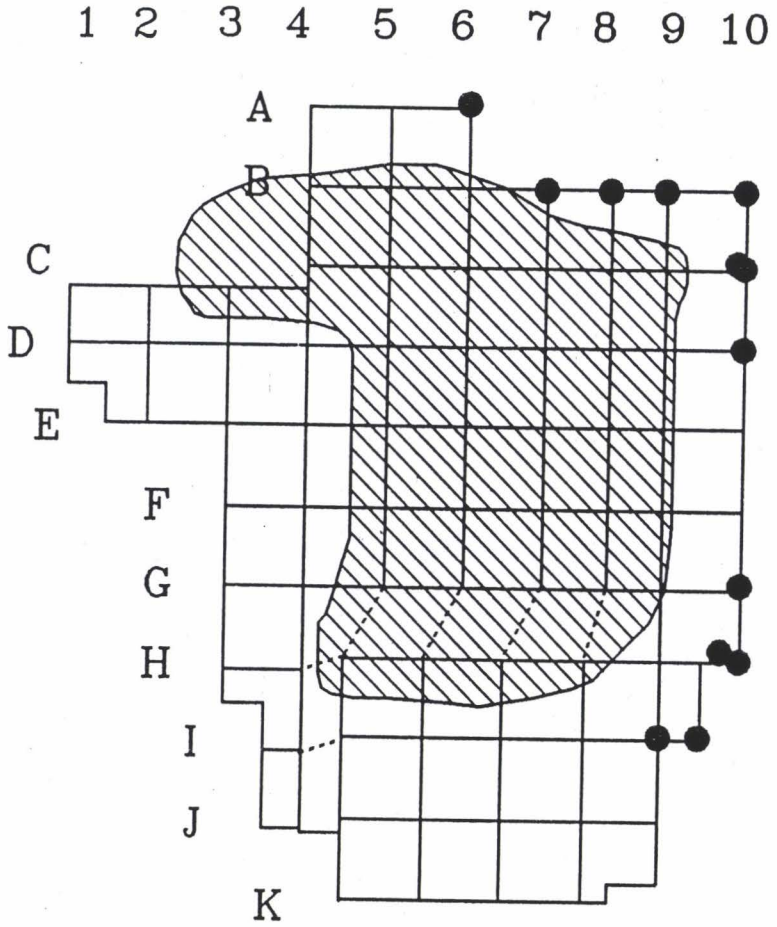
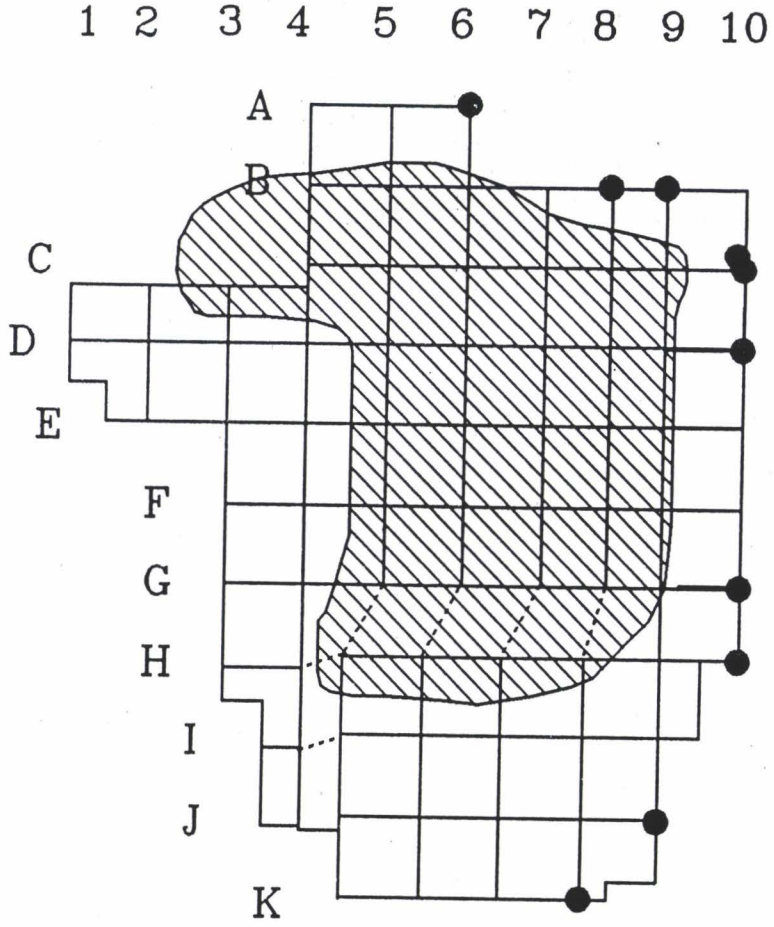


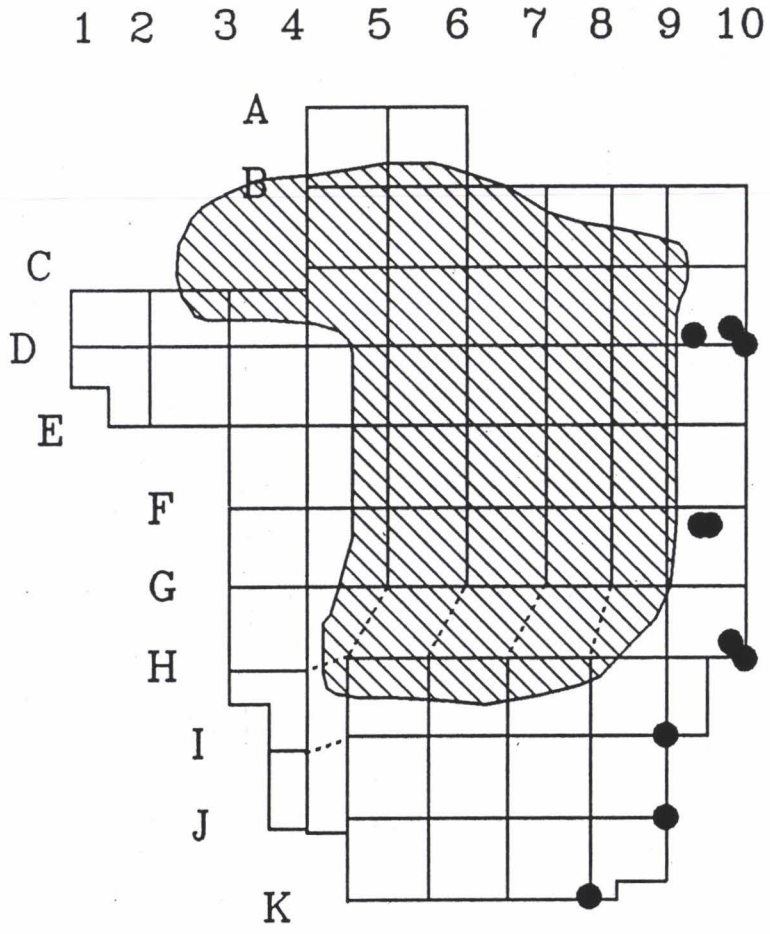
Carex rossii

Vegetation Survey Plots, 1991



Cercocarpus montanus

Vegetation Survey Plots, 1991



Chenopodium fremontii

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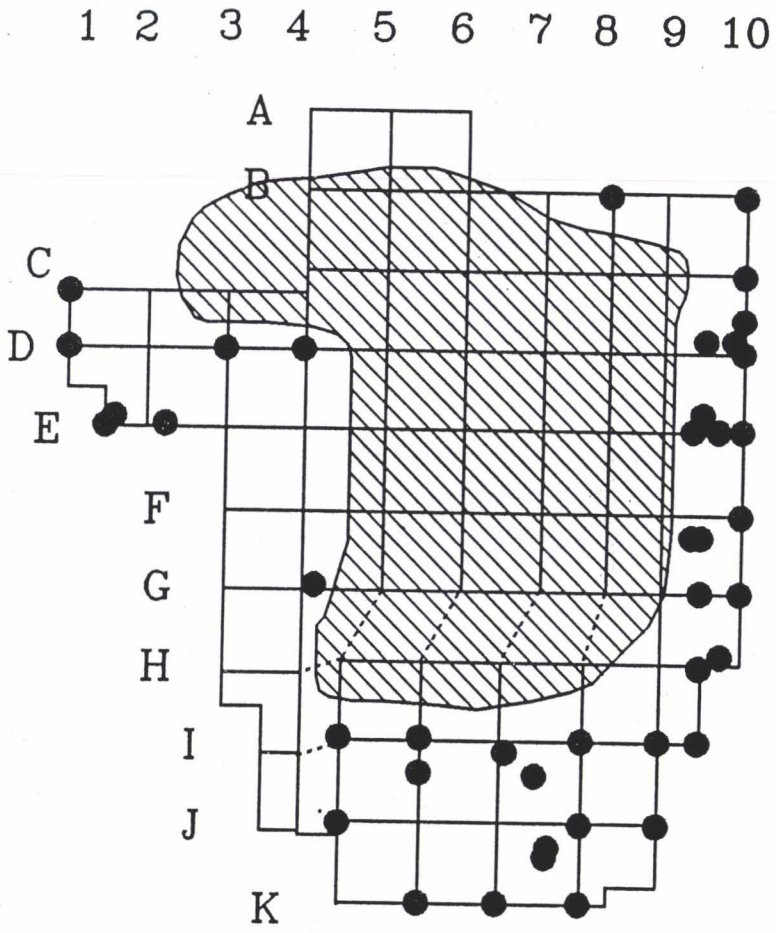
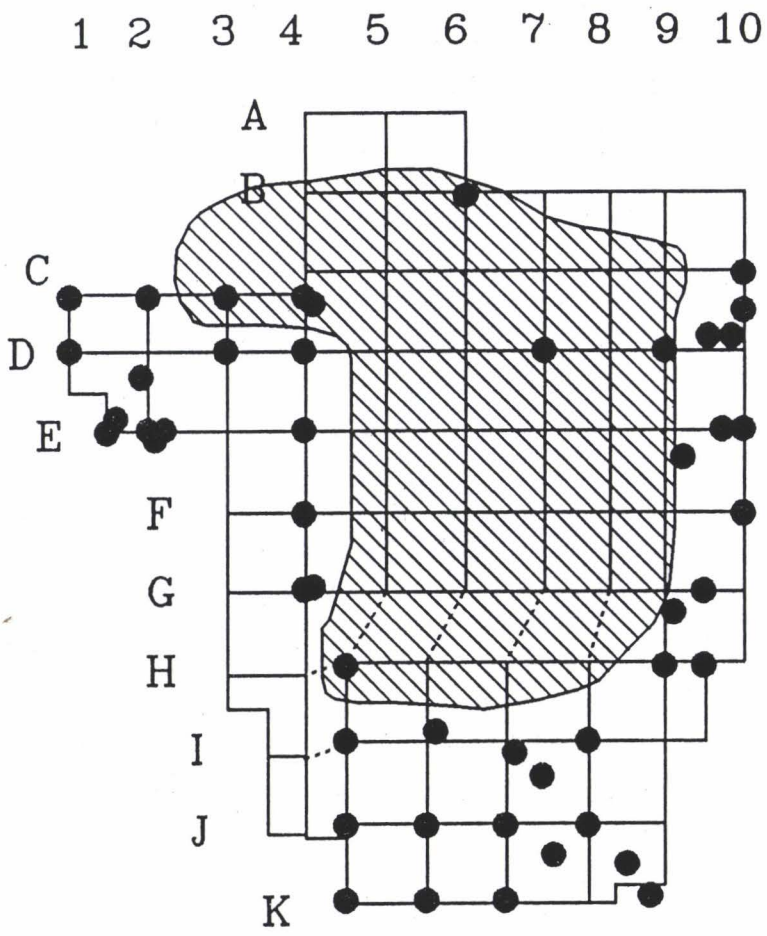


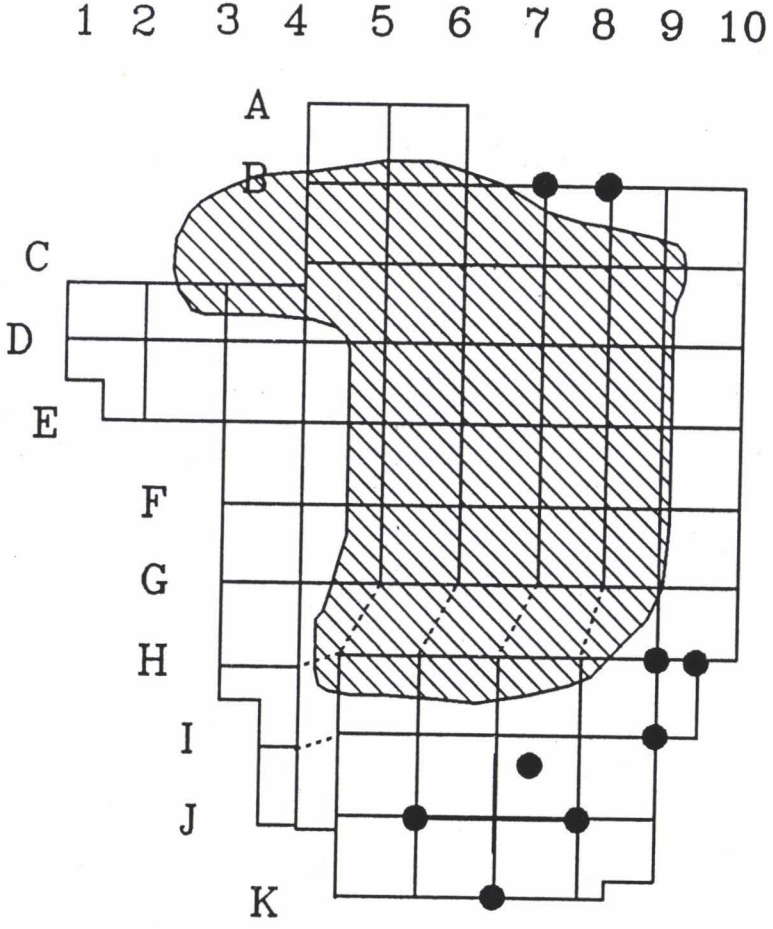
Chenopodium leptophyllum

Vegetation Survey Plots, 1991



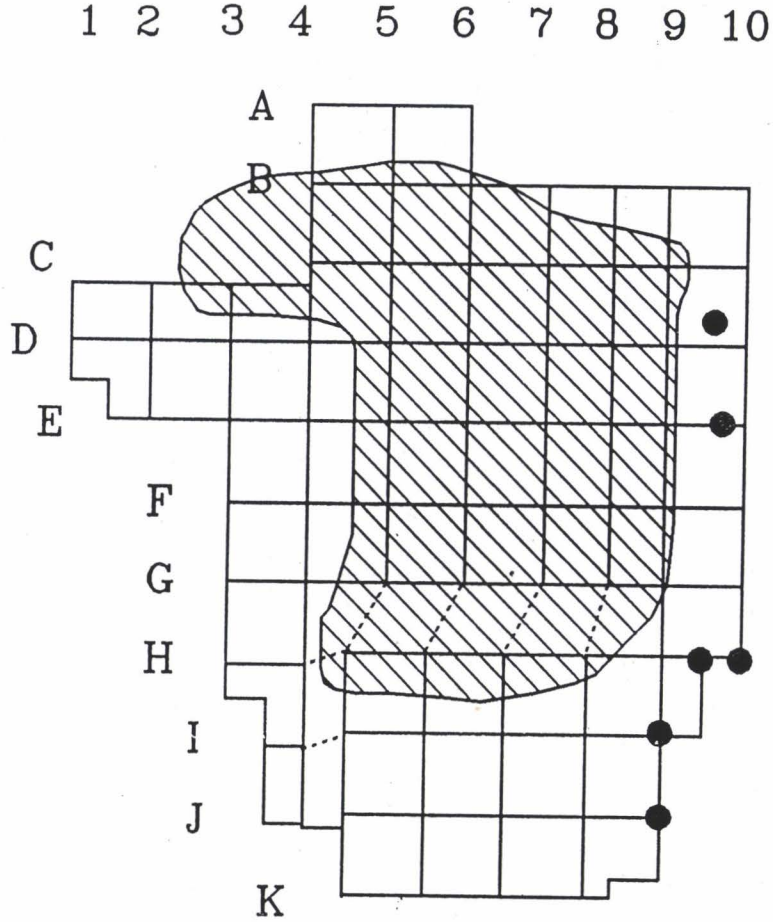
Chrysothamnus nauseosus

Vegetation Survey Plots, 1991



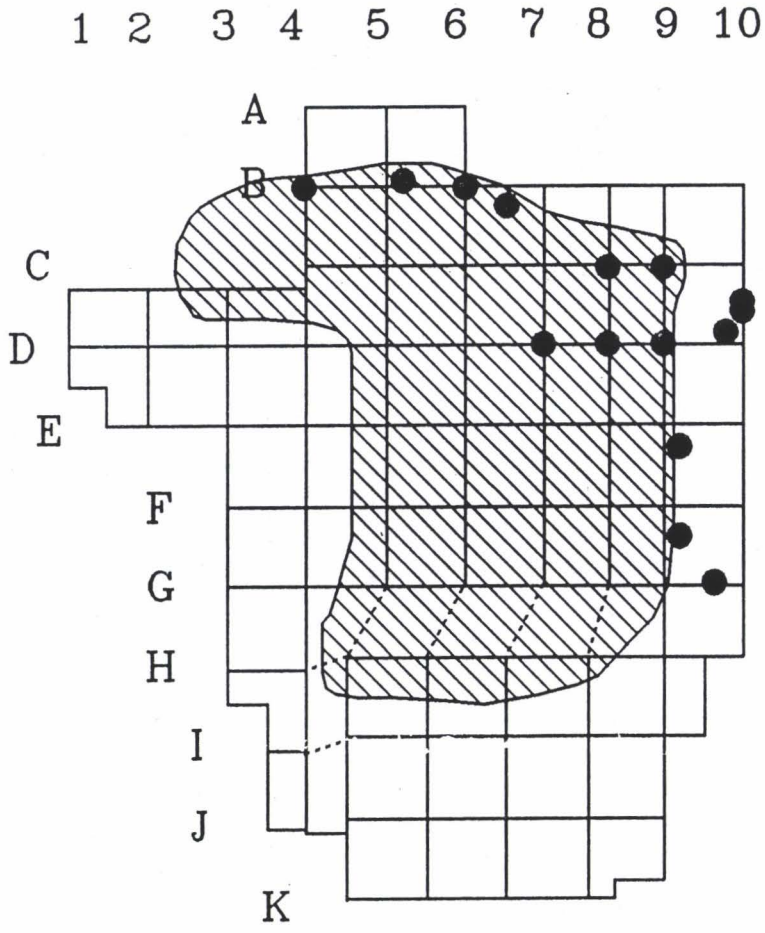
Chrysothamnus parryi

Vegetation Survey Plots, 1991



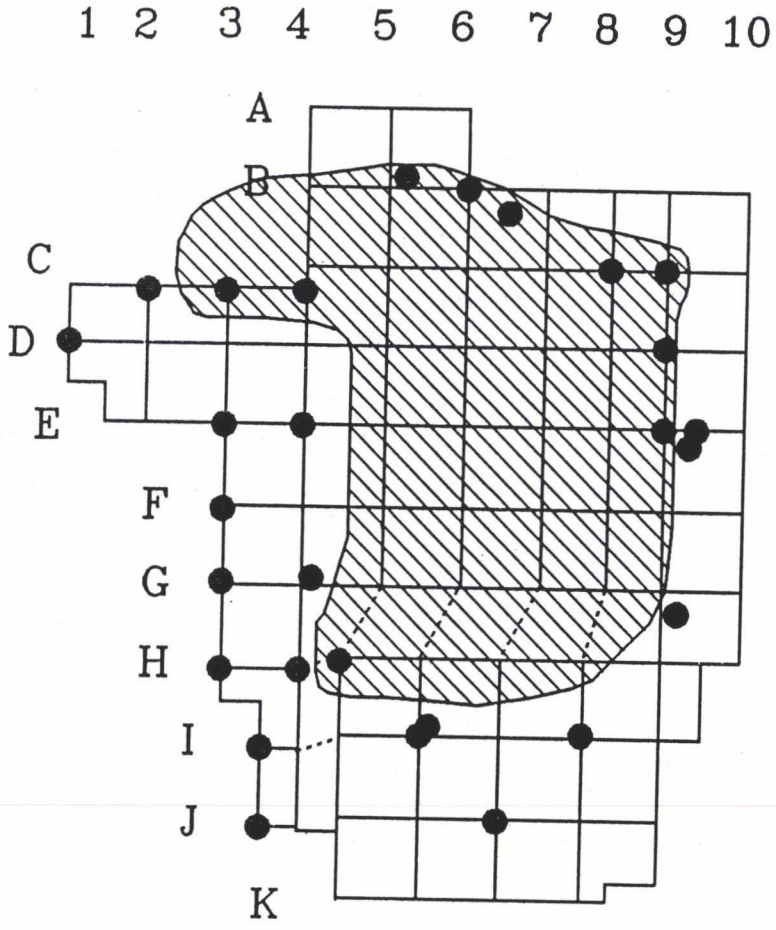
Chrysothamnus viscidiflorus

Vegetation Survey Plots, 1991



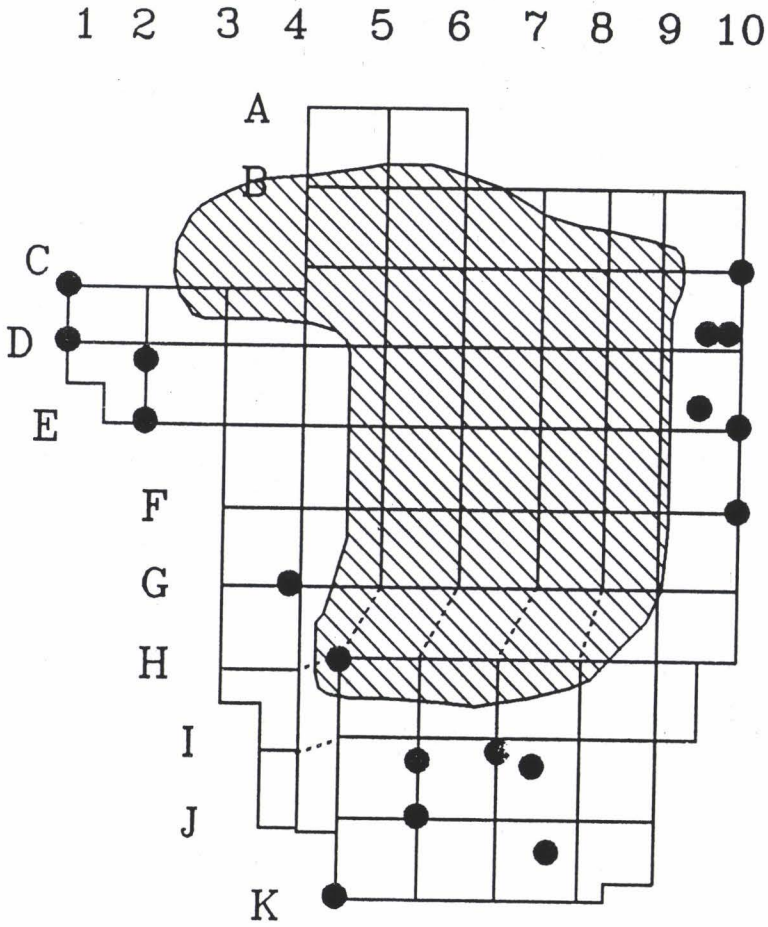
Cirsium undulatum

Vegetation Survey Plots, 1991



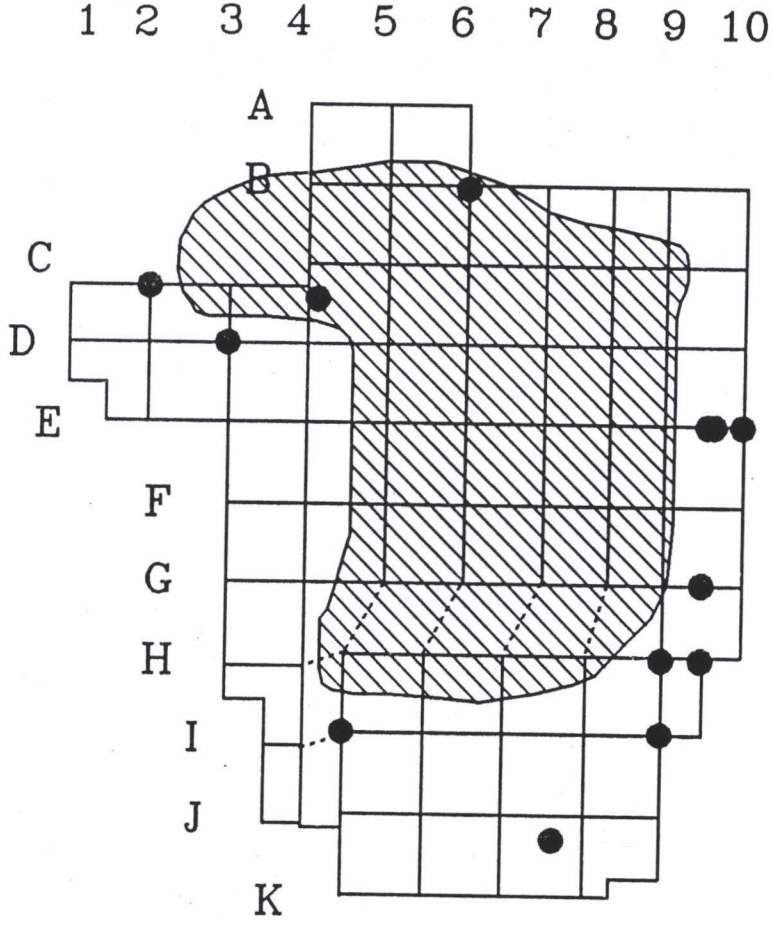
Corispermum nitidum

Vegetation Survey Plots, 1991



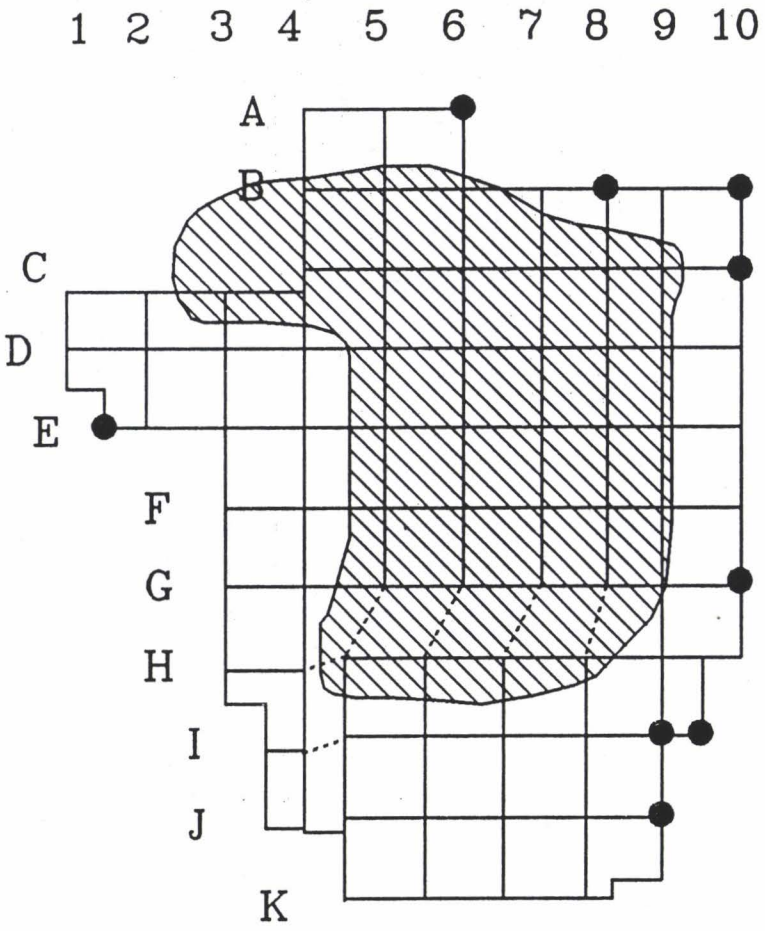
Cryptantha fendleri

Vegetation Survey Plots, 1991



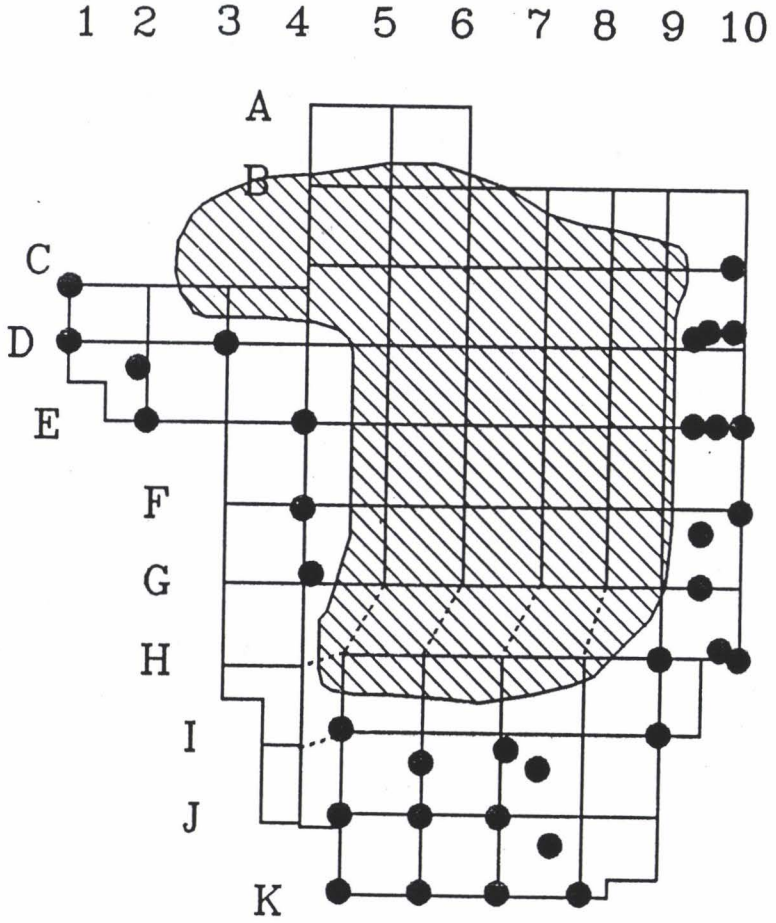
Cryptantha jamesii

Vegetation Survey Plots, 1991



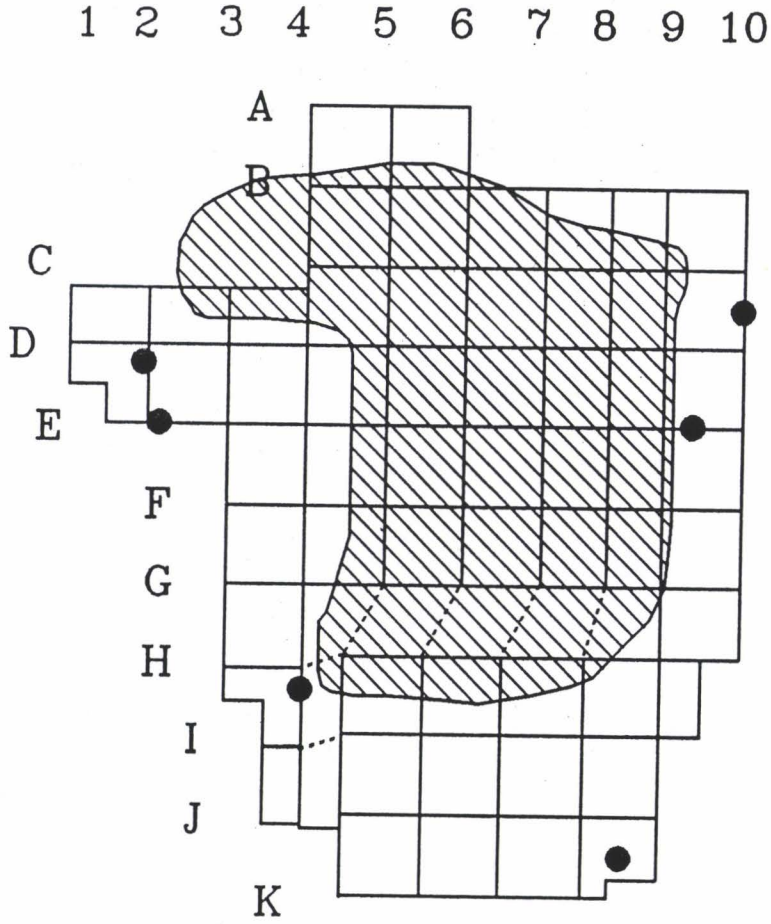
Descurainia pinnata

Vegetation Survey Plots, 1991



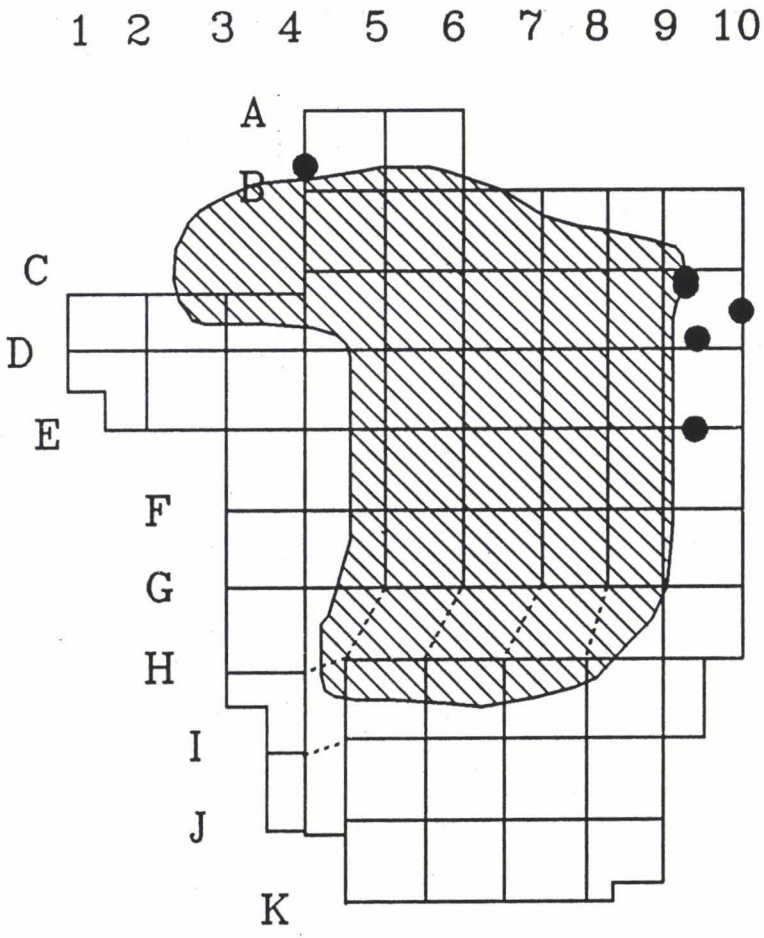
Descurainia richardsonii

Vegetation Survey Plots, 1991



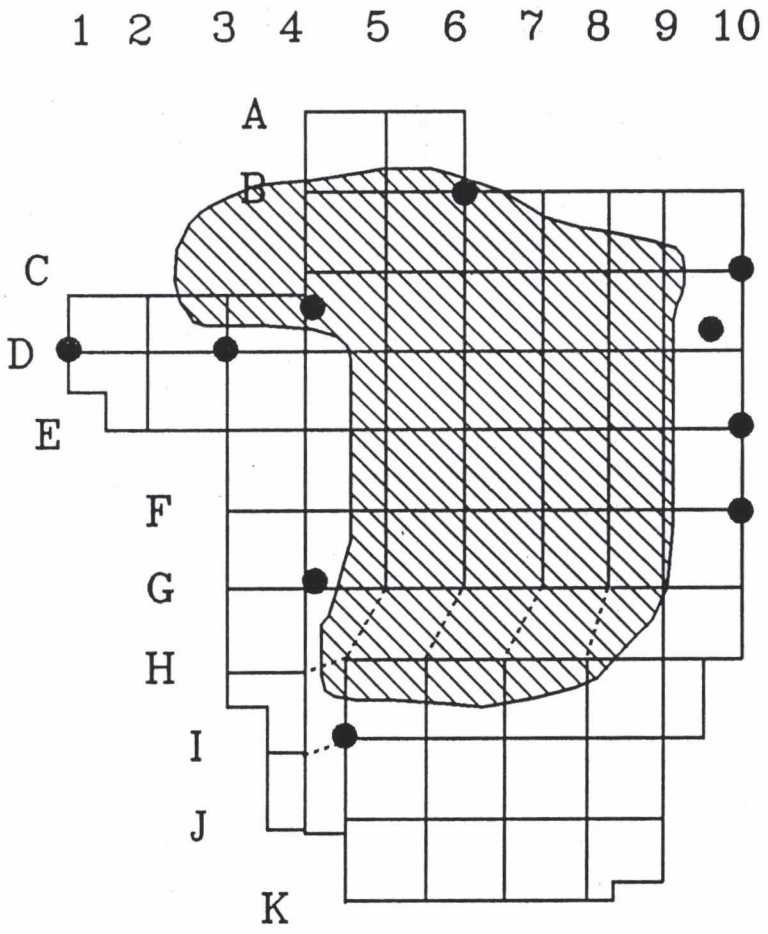
Epilobium glandulosum

Vegetation Survey Plots, 1991



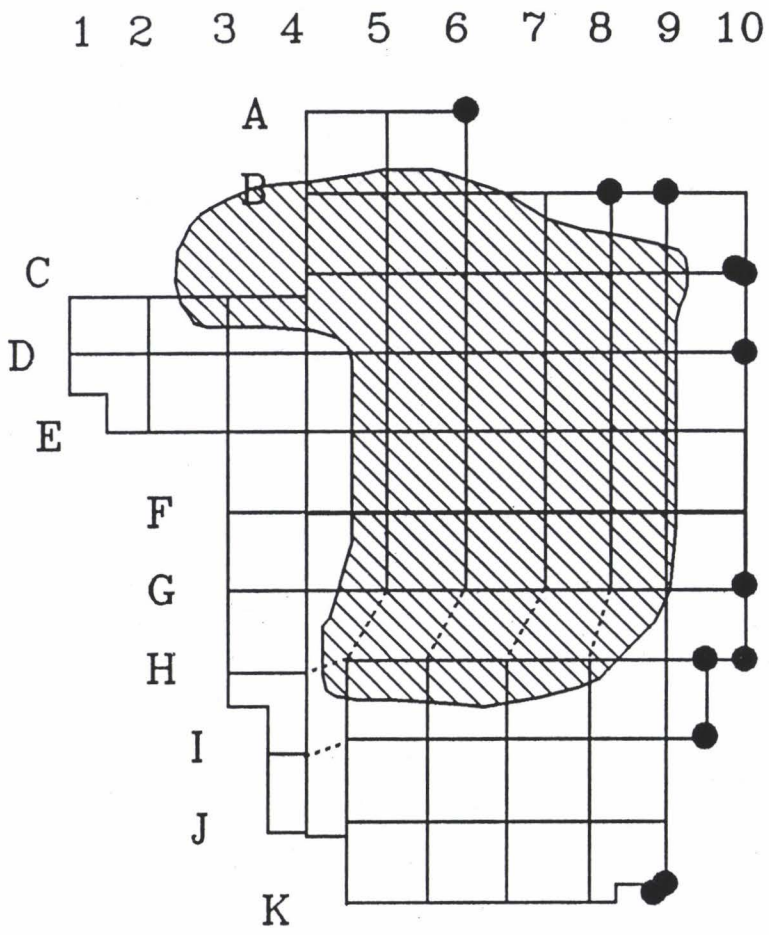
Equisetum arvense

Vegetation Survey Plots, 1991



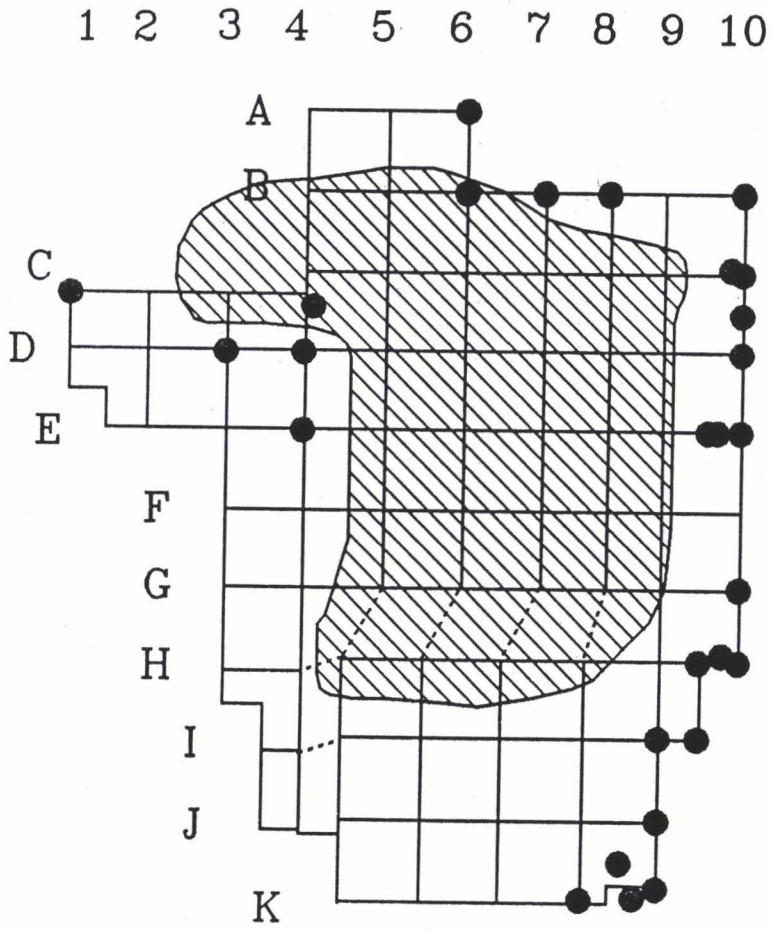
Eriogonum cernuum

Vegetation Survey Plots, 1991



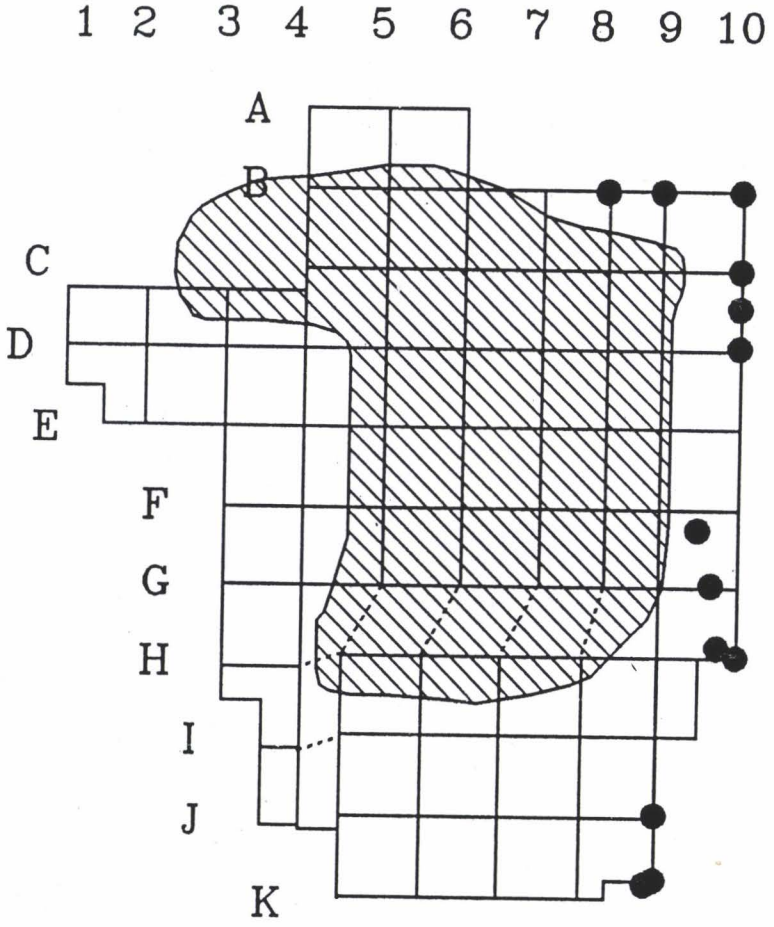
Eriogonum jamesii

Vegetation Survey Plots, 1991



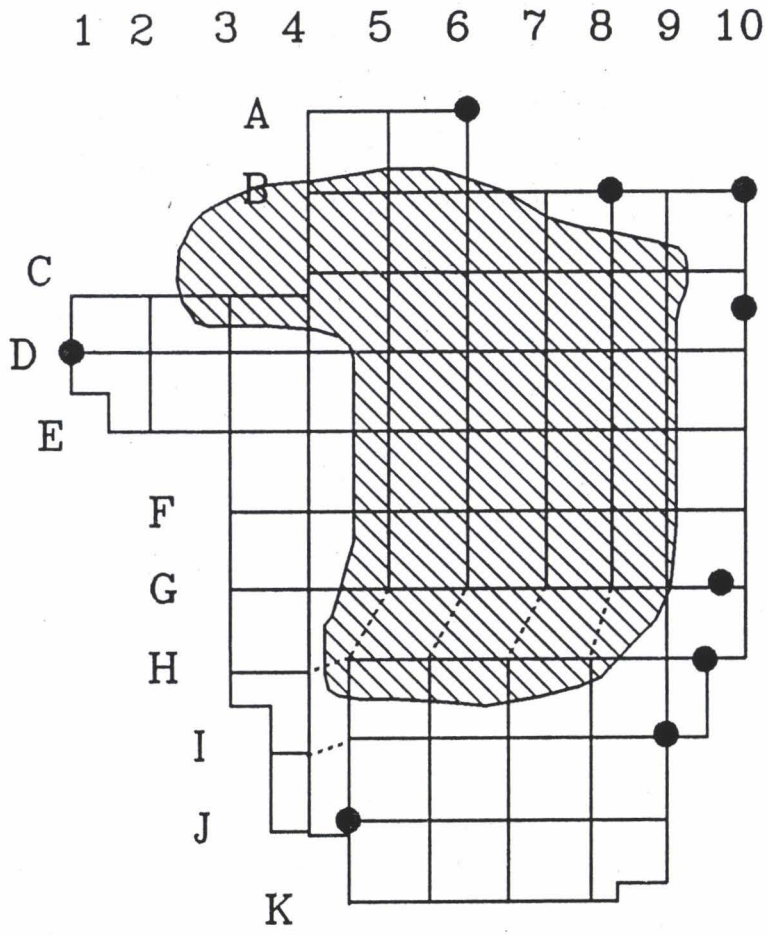
Erysimum asperum

Vegetation Survey Plots, 1991



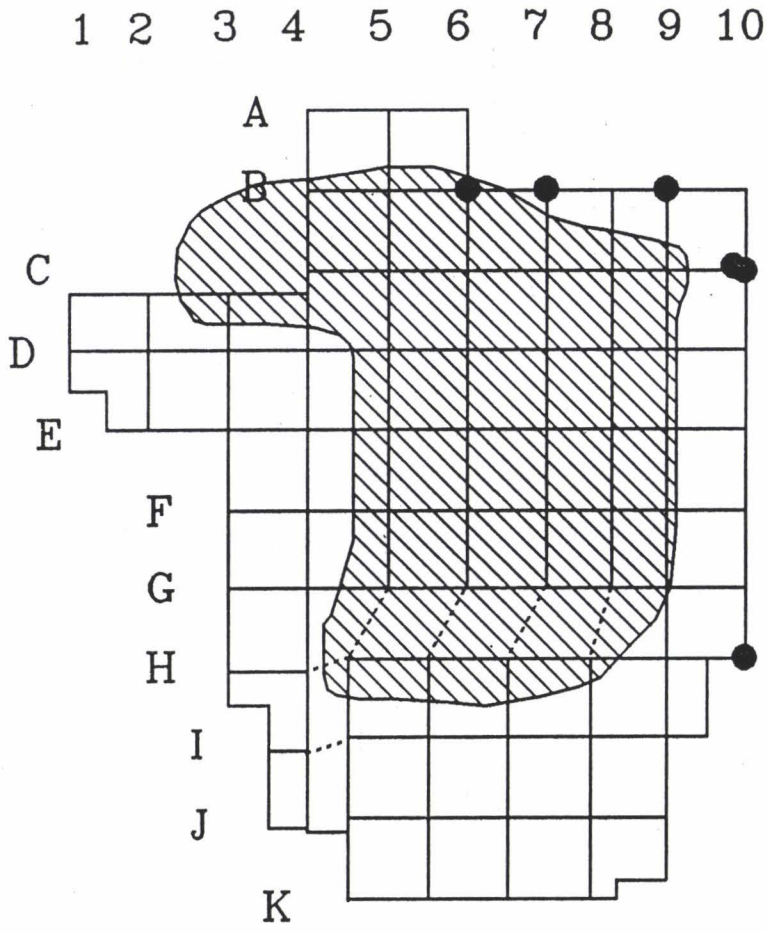
Festuca ovina

Vegetation Survey Plots, 1991



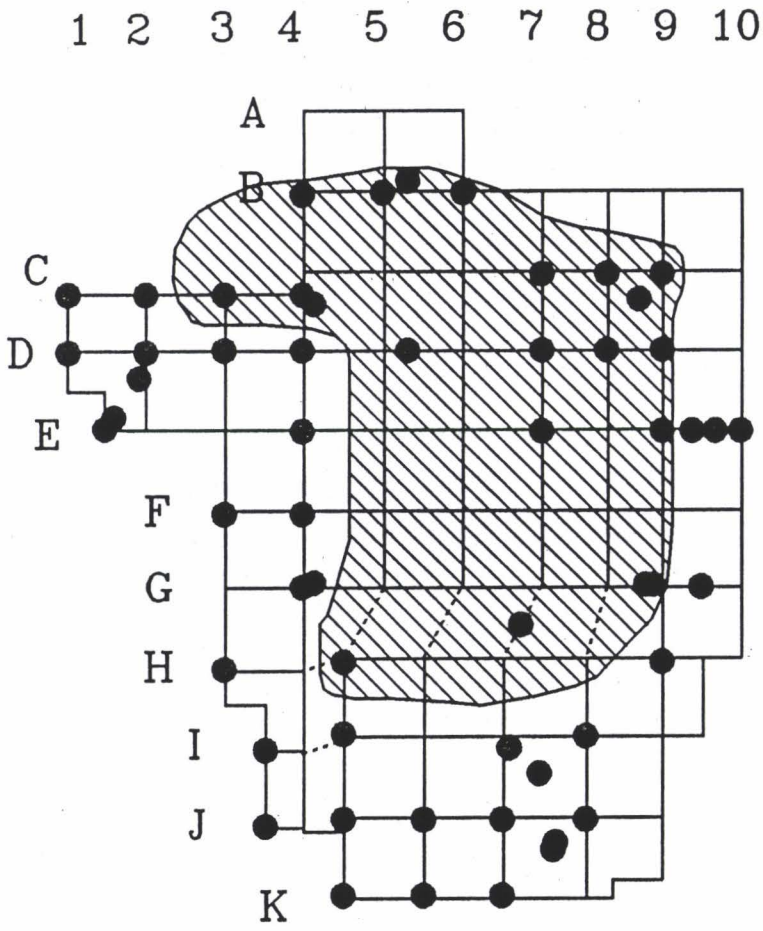
Gilia aggregata

Vegetation Survey Plots, 1991



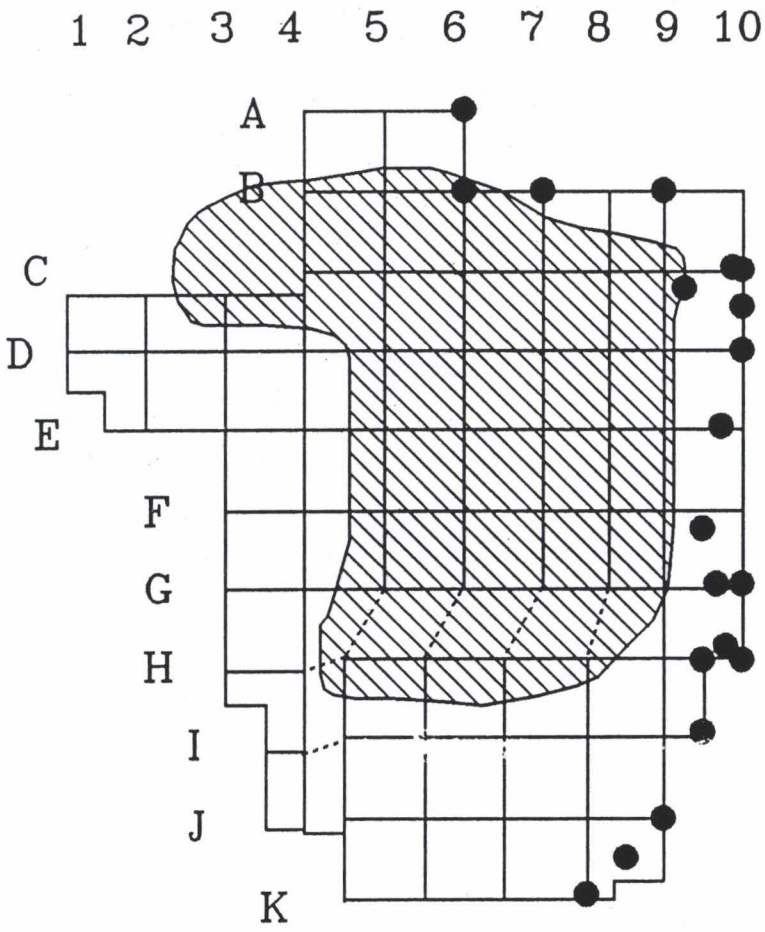
Gilia pinnatifida

Vegetation Survey Plots, 1991



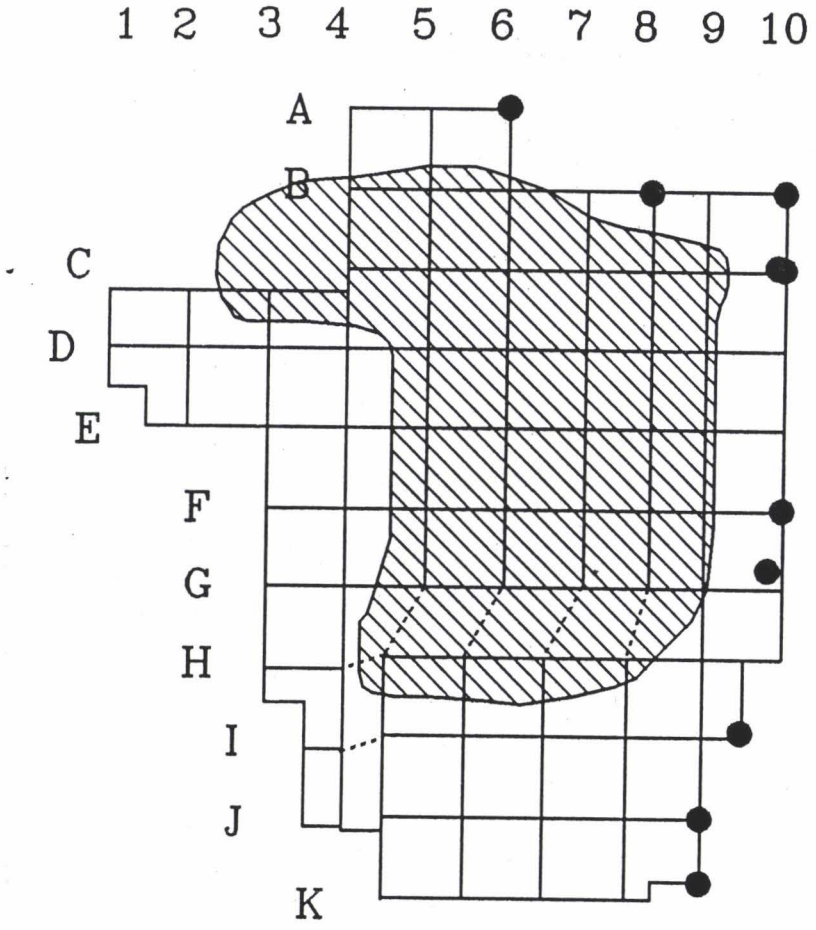
Helianthus petiolaris

Vegetation Survey Plots, 1991



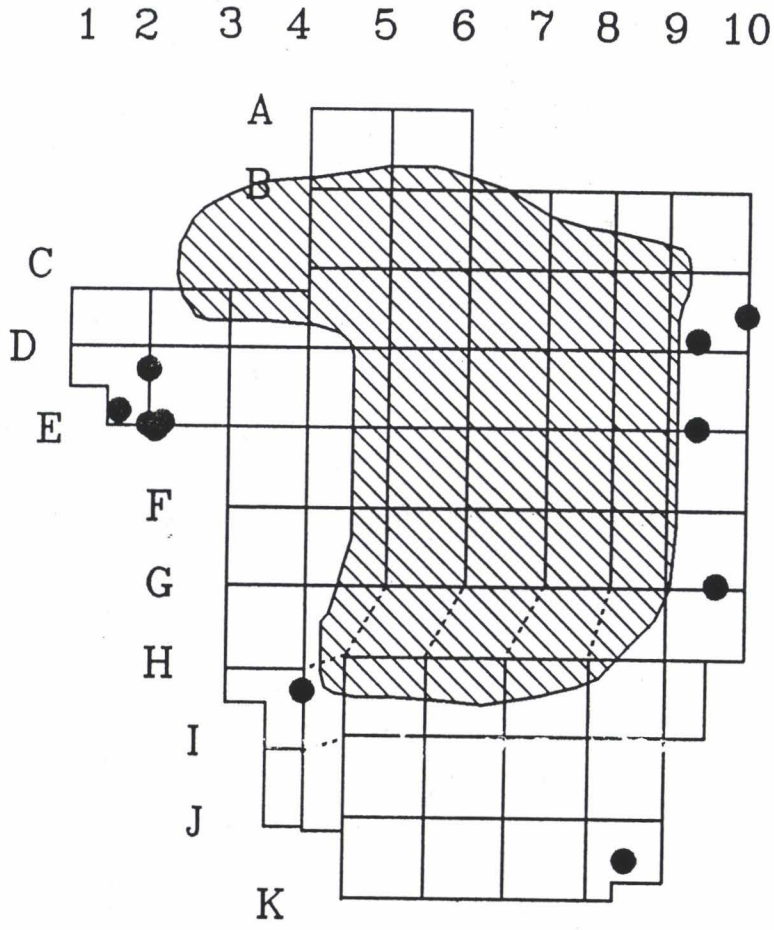
Heterotheca villosa

Vegetation Survey Plots, 1991



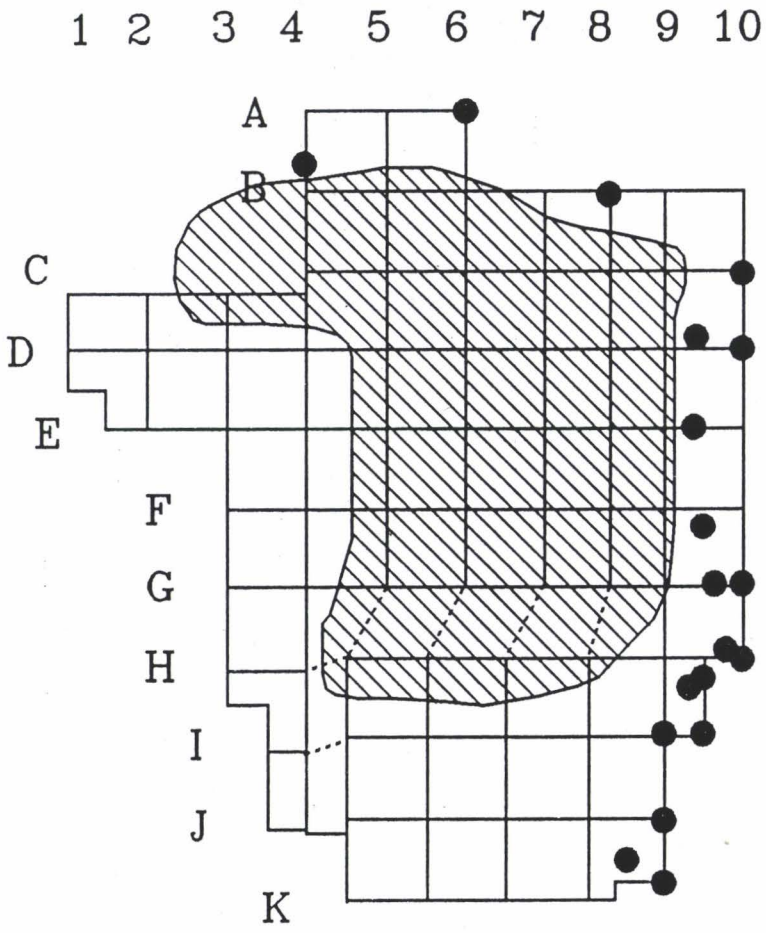
Holodiscus dumosus

Vegetation Survey Plots, 1991



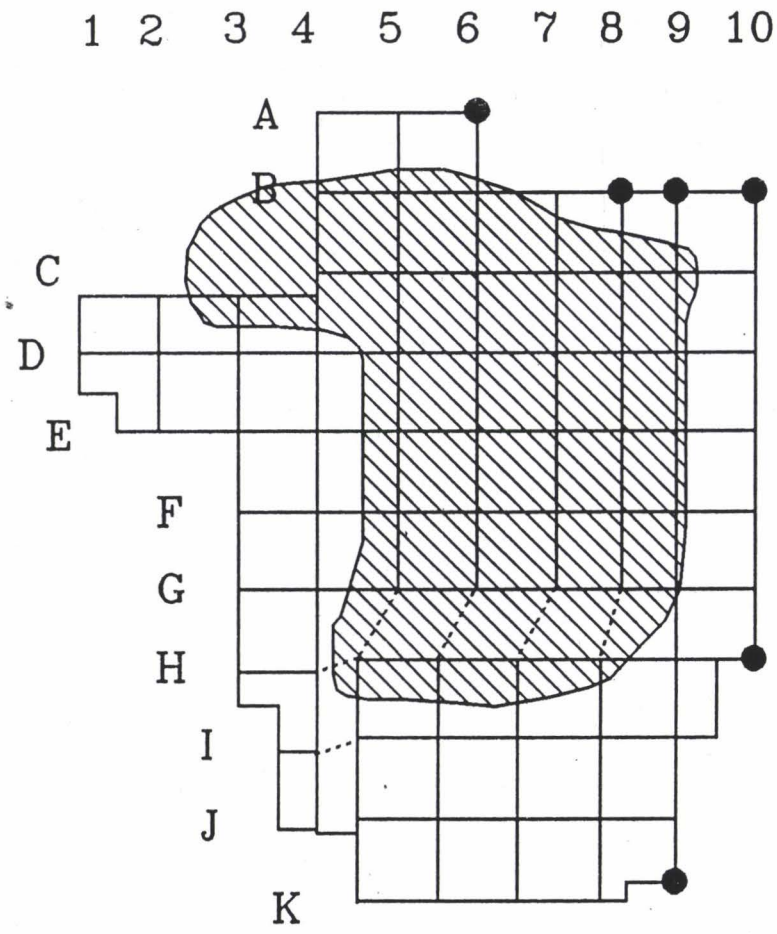
Juncus balticus

Vegetation Survey Plots, 1991



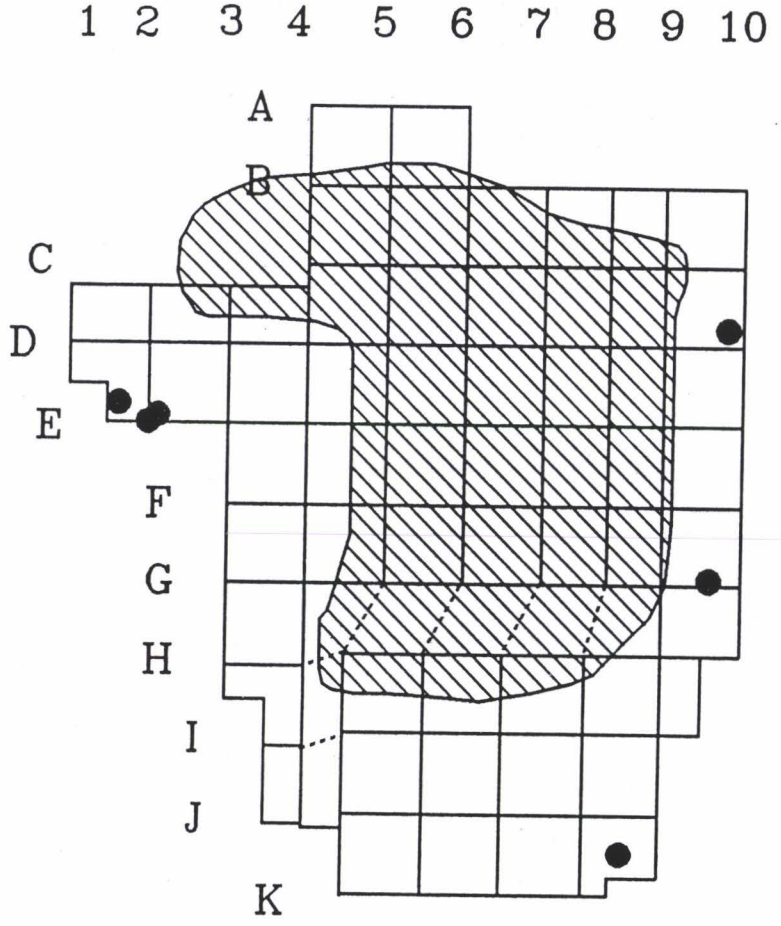
Juniperus scopulorum

Vegetation Survey Plots, 1991



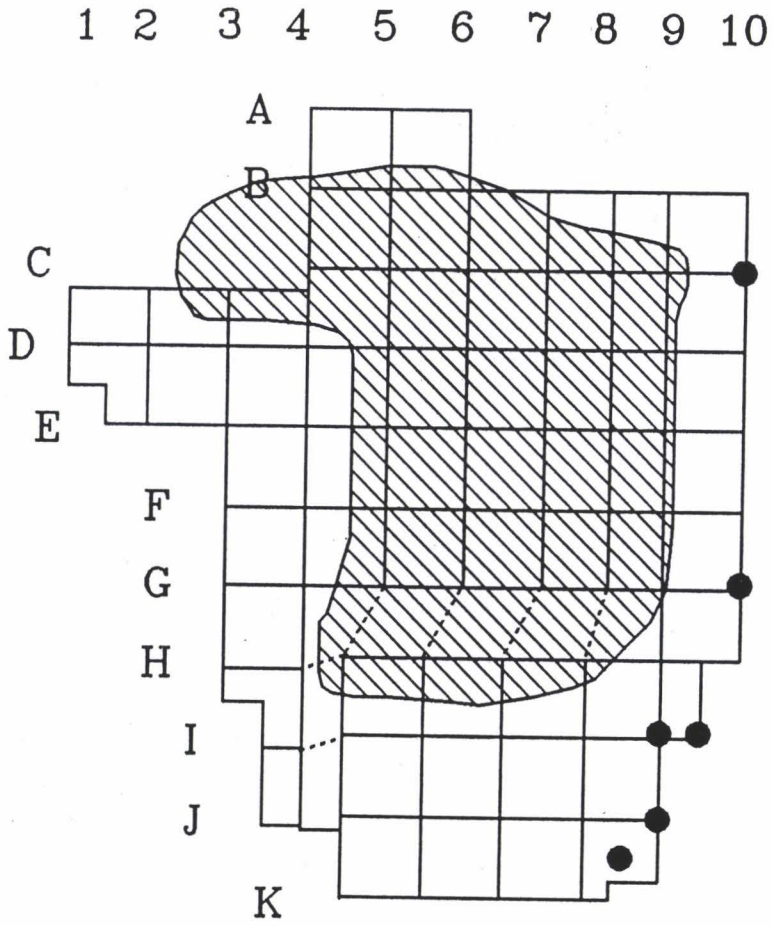
Koeleria nitida

Vegetation Survey Plots, 1991



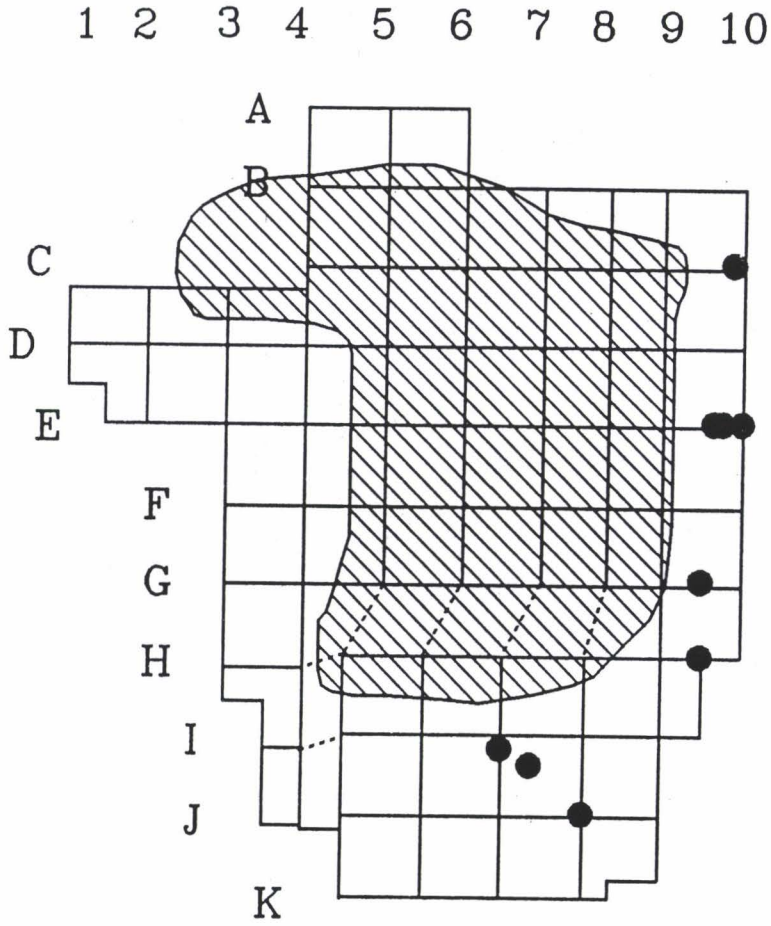
Lactuca tatarica

Vegetation Survey Plots, 1991



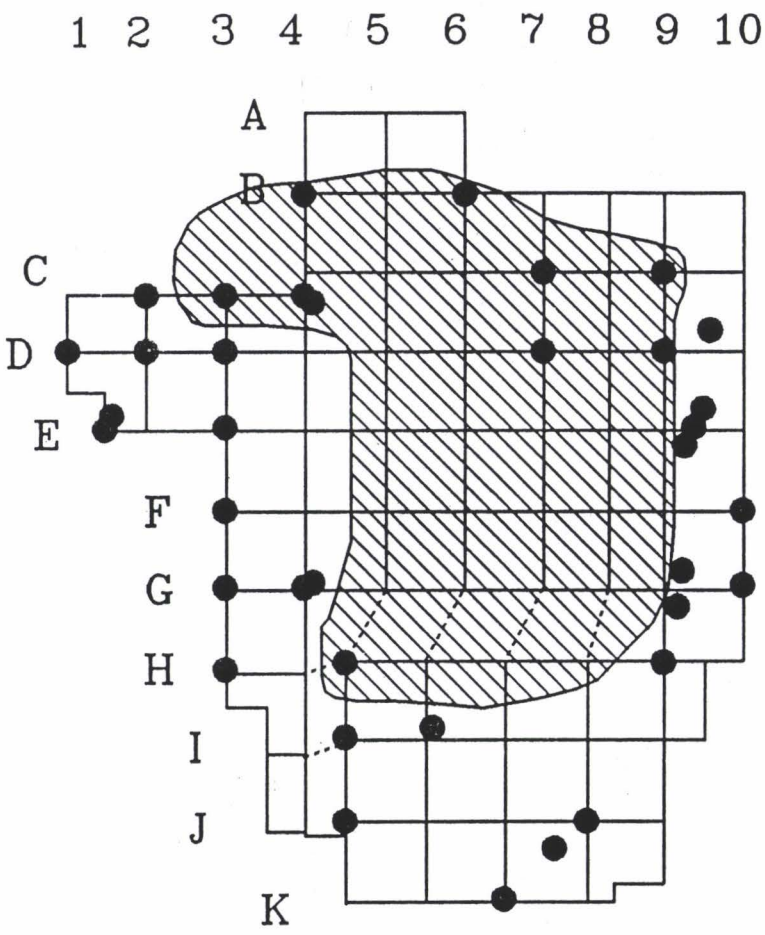
Lappula redowskii

Vegetation Survey Plots, 1991



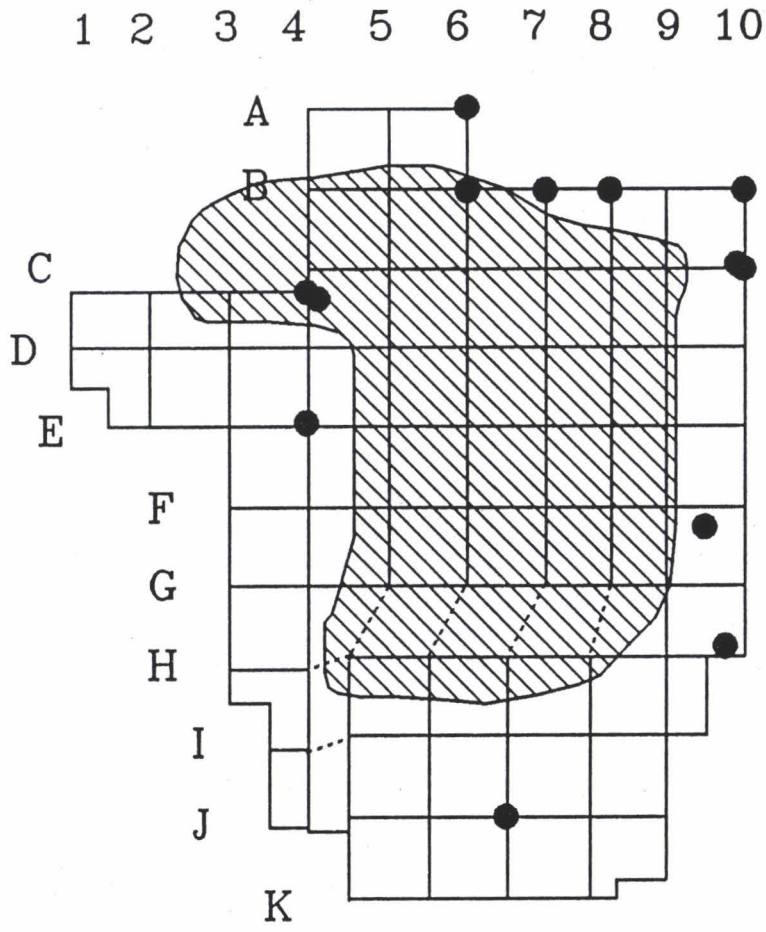
Lithospermum incisum

Vegetation Survey Plots, 1991



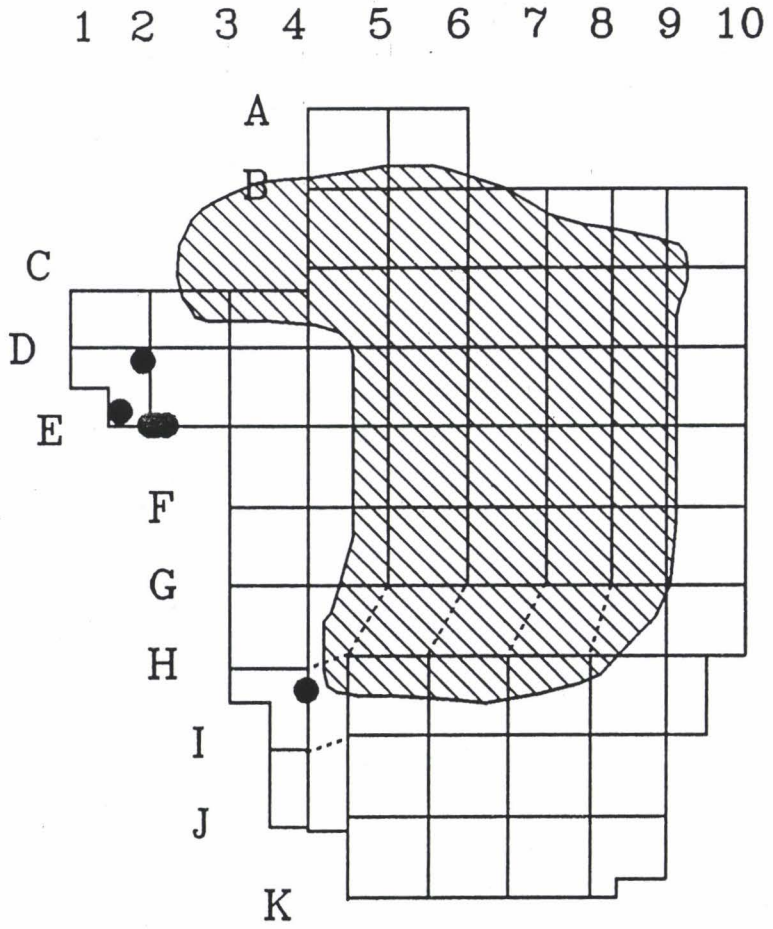
Lygodesmia juncea

Vegetation Survey Plots, 1991



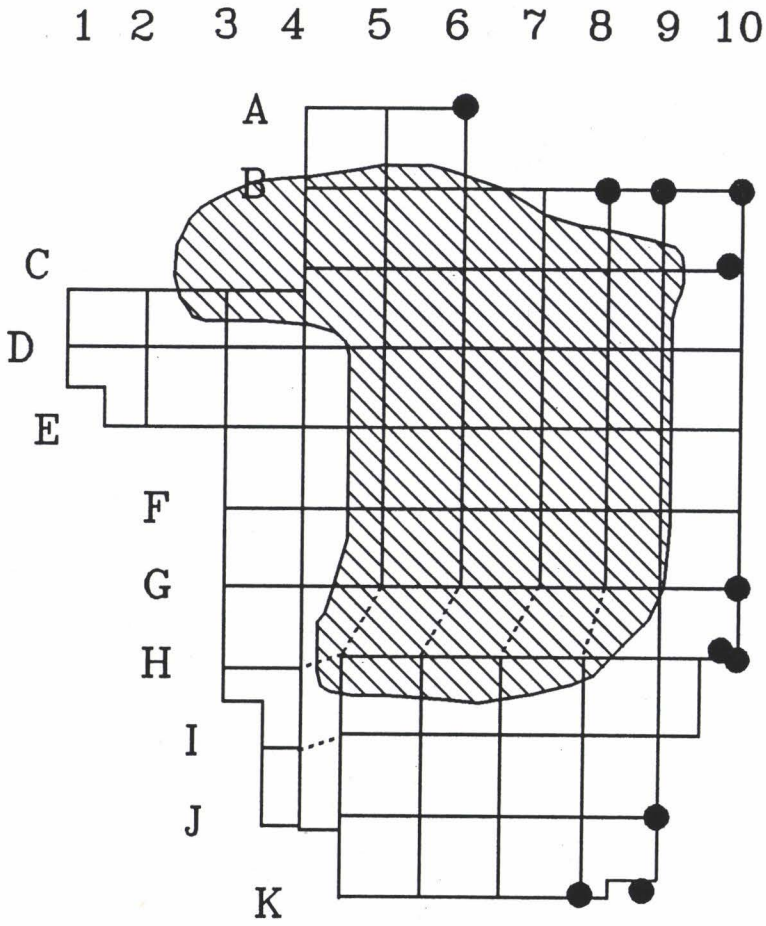
Machaeranthera canescens

Vegetation Survey Plots, 1991



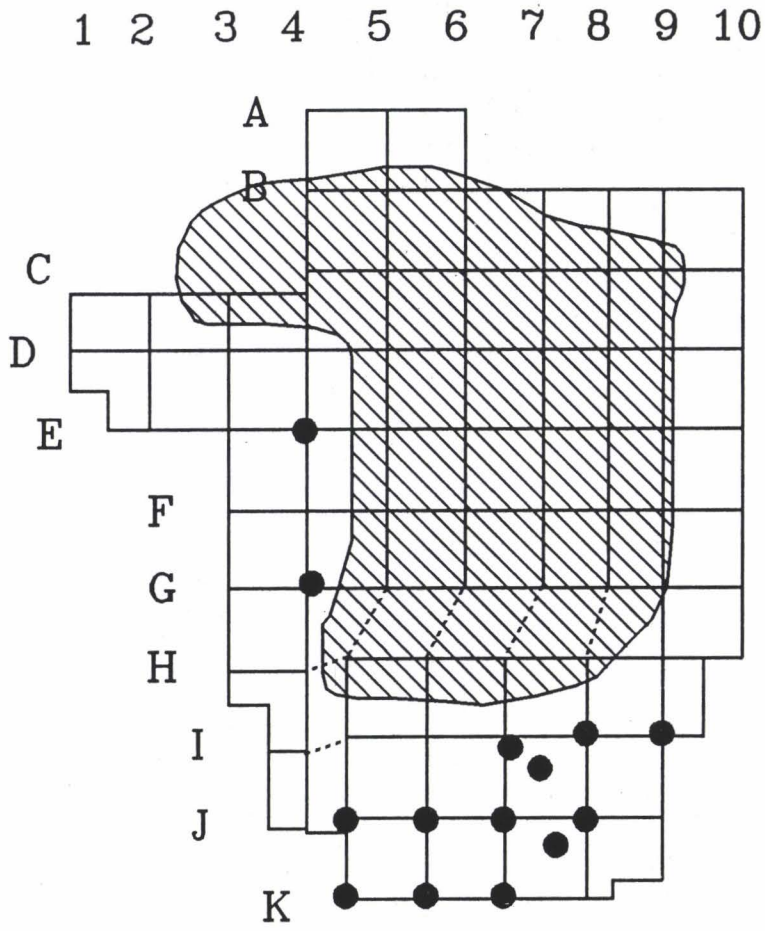
Muhlenbergia asperifolia

Vegetation Survey Plots, 1991



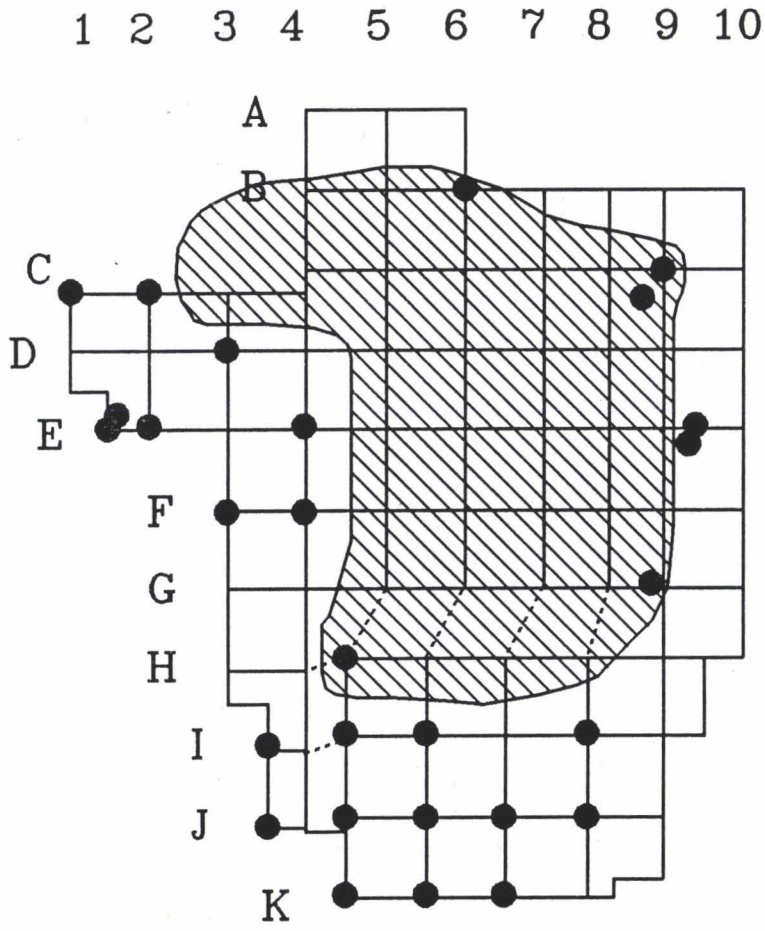
Muhlenbergia montana

Vegetation Survey Plots, 1991



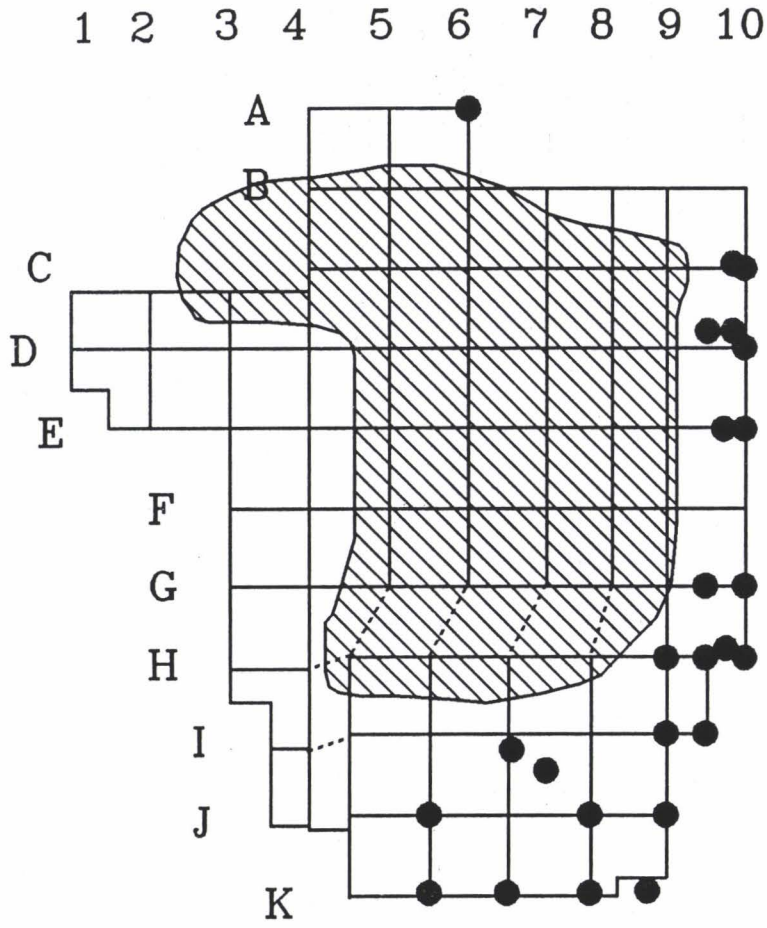
Muhlenbergia pungens

Vegetation Survey Plots, 1991



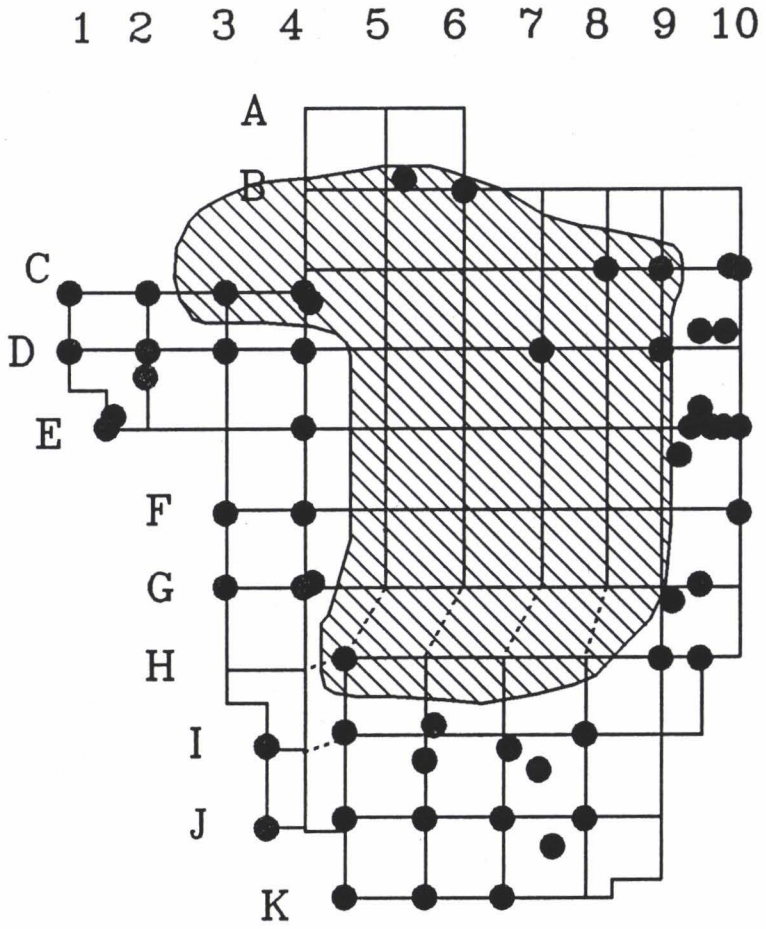
Oenothera coronopifolia

Vegetation Survey Plots, 1991



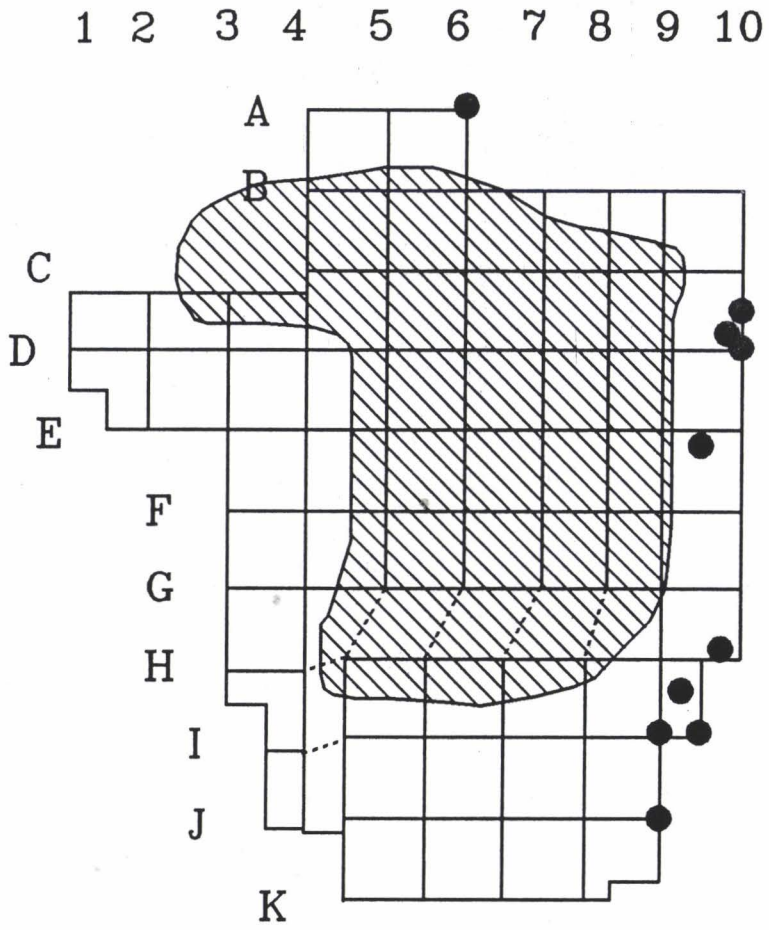
Opuntia polycantha

Vegetation Survey Plots, 1991



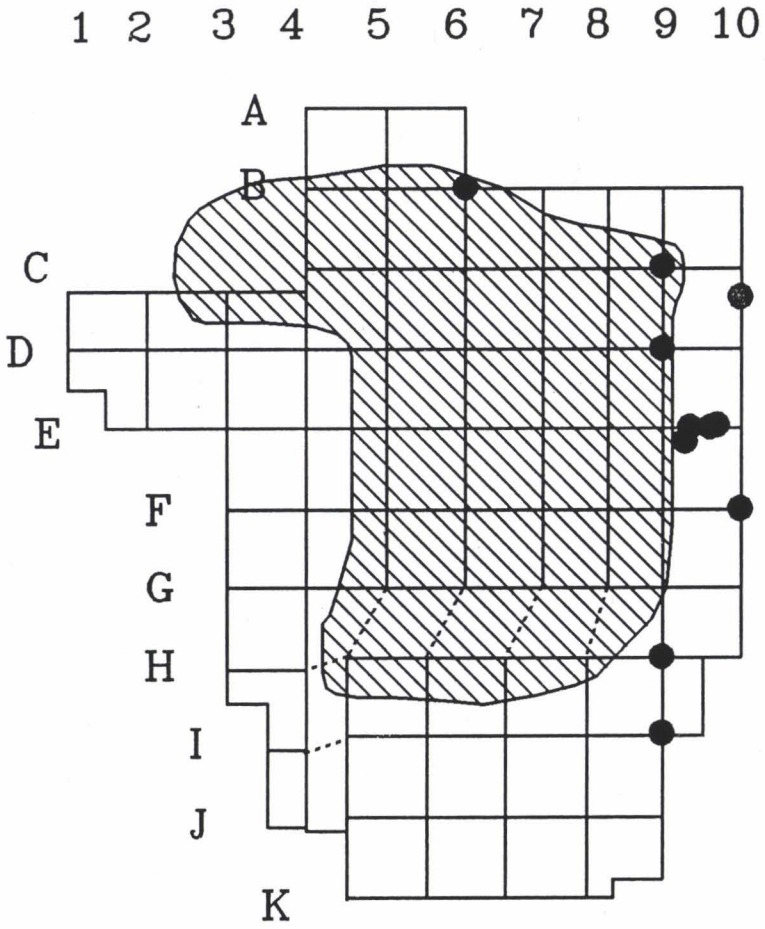
Oryzopsis hymenoides

Vegetation Survey Plots, 1991



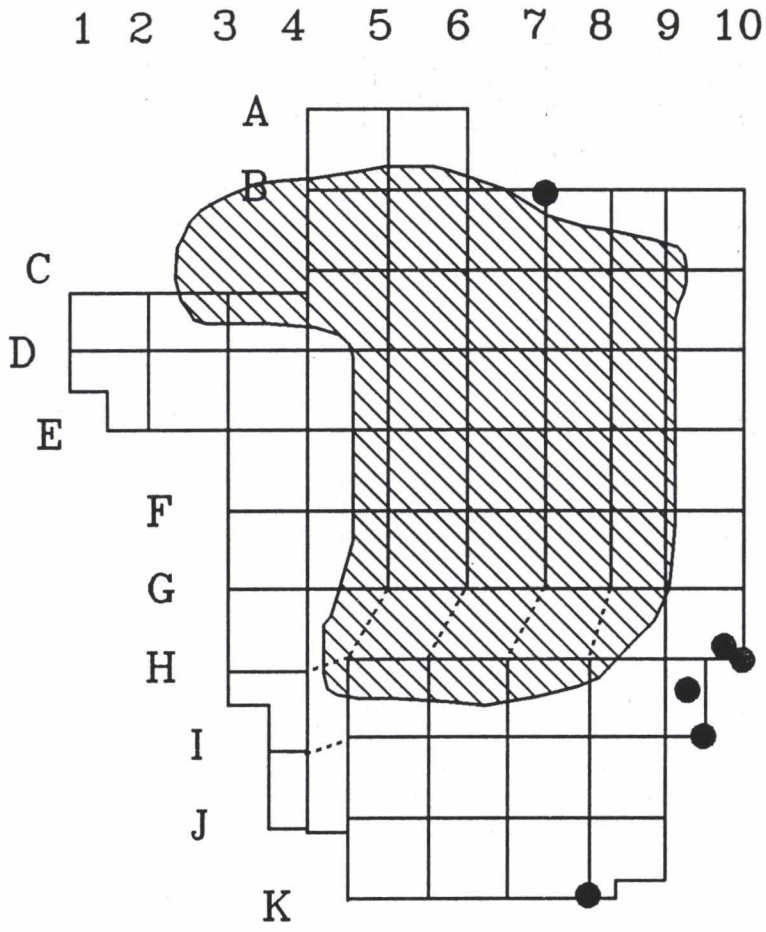
Oryzopsis micrantha

Vegetation Survey Plots, 1991



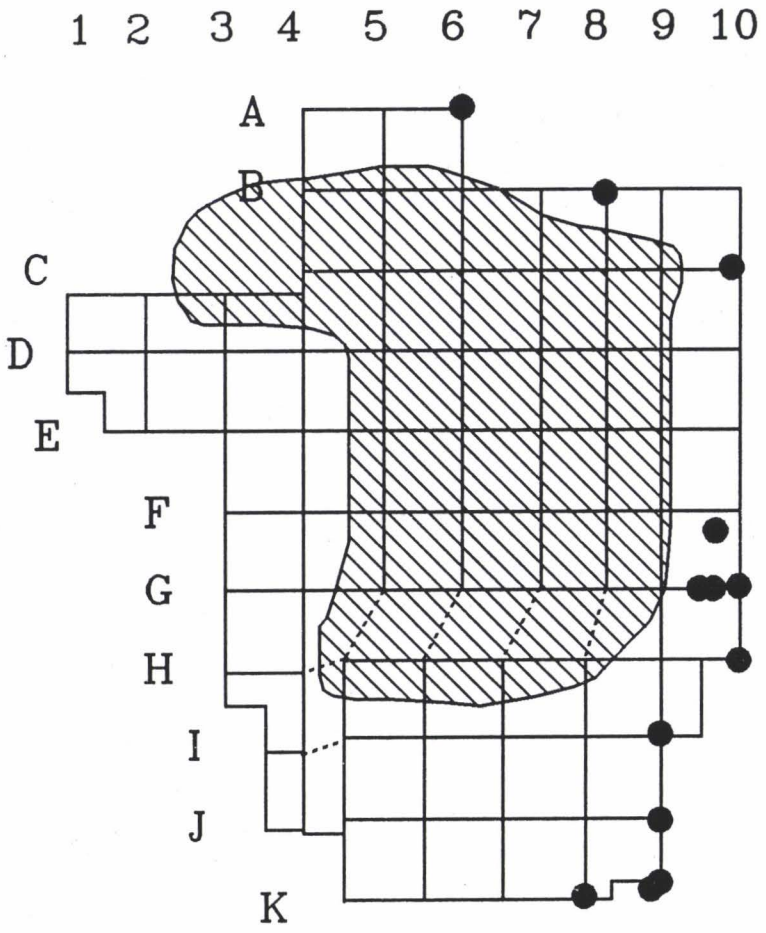
Penstemon angustifolius

Vegetation Survey Plots, 1991



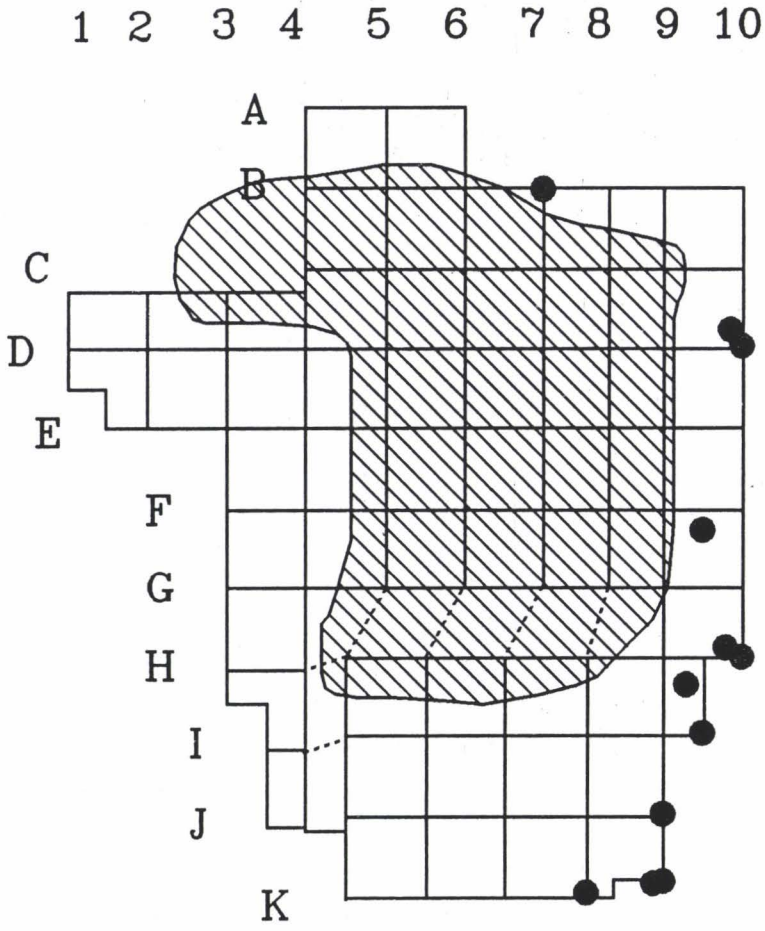
Penstemon barbatus

Vegetation Survey Plots, 1991



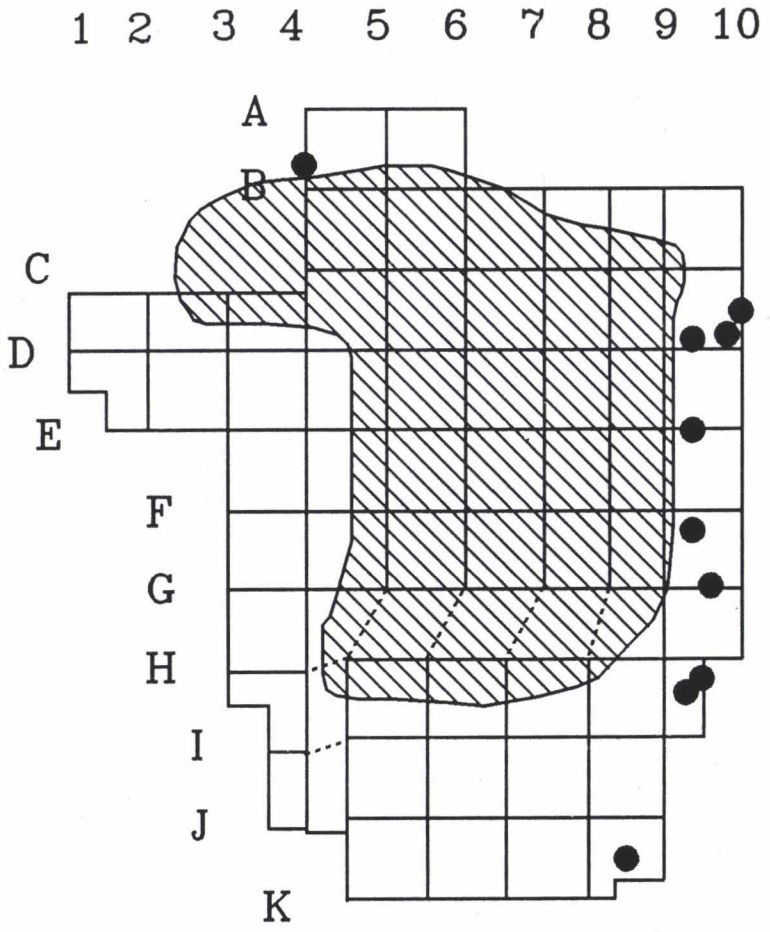
Pinus edulis

Vegetation Survey Plots, 1991



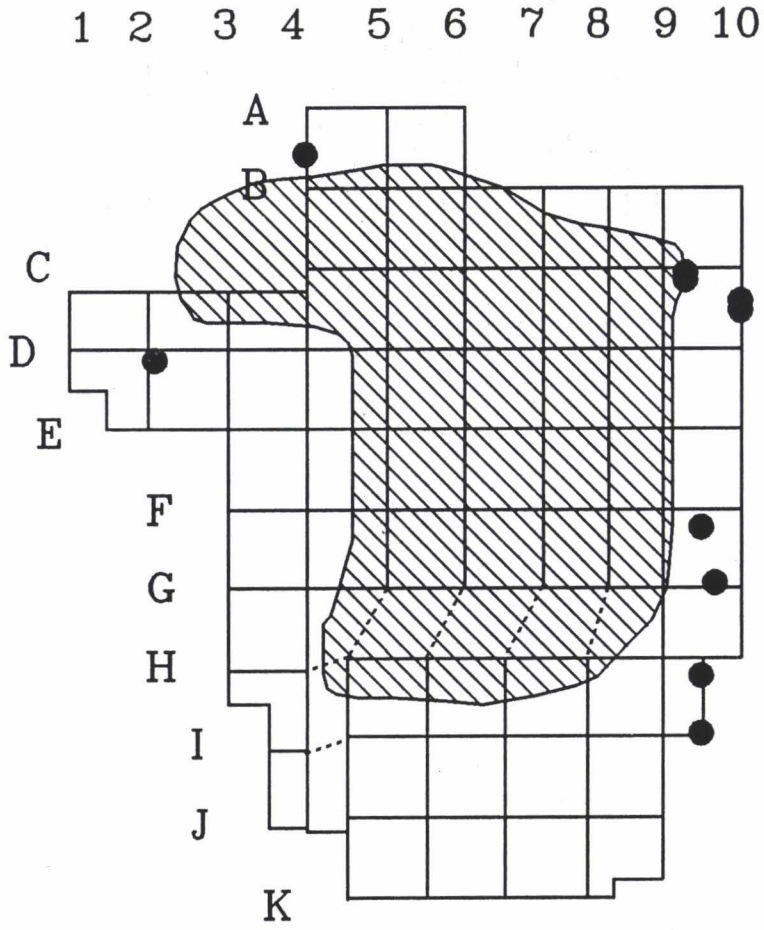
Poa fendeleriana

Vegetation Survey Plots, 1991



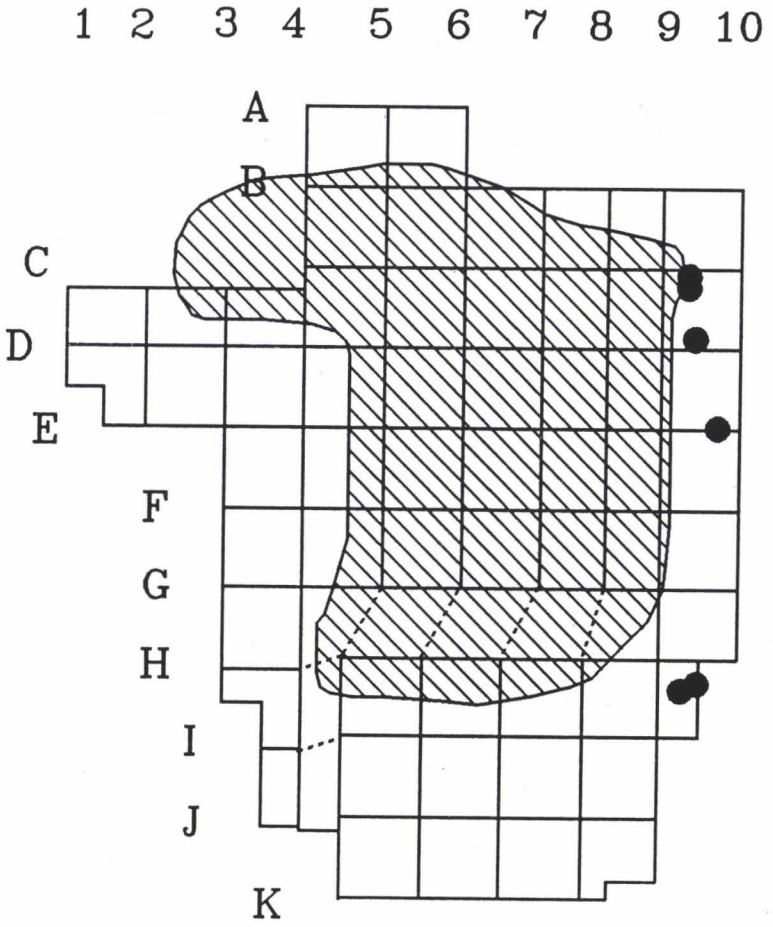
Poa pratensis

Vegetation Survey Plots, 1991



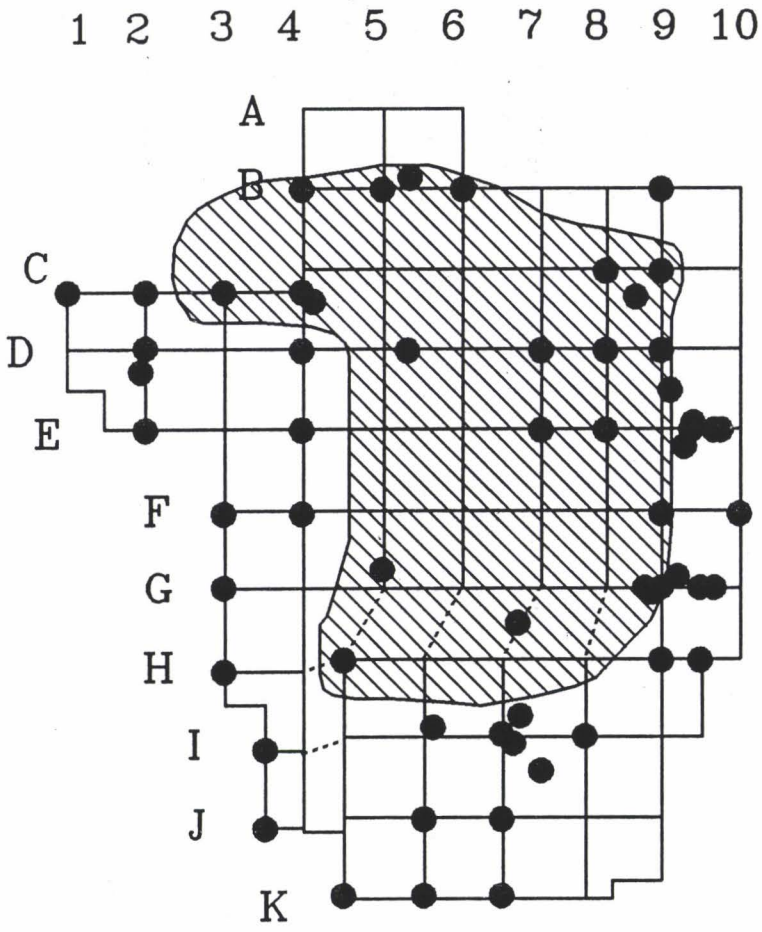
Populus angustifolia

Vegetation Survey Plots, 1991



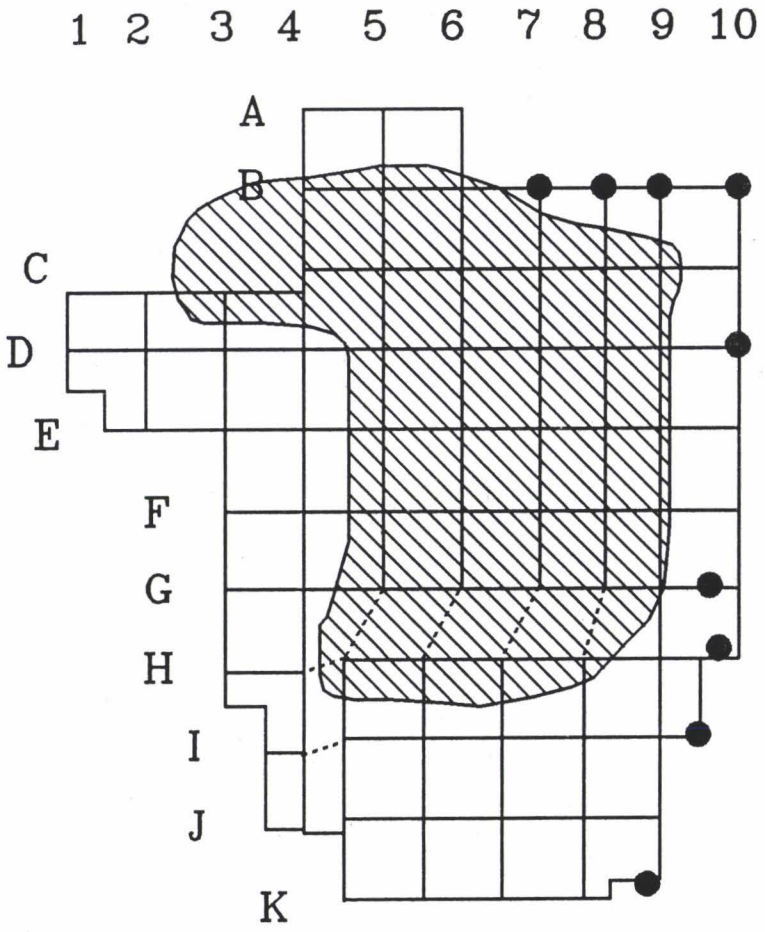
Populus tremuloides

Vegetation Survey Plots, 1991



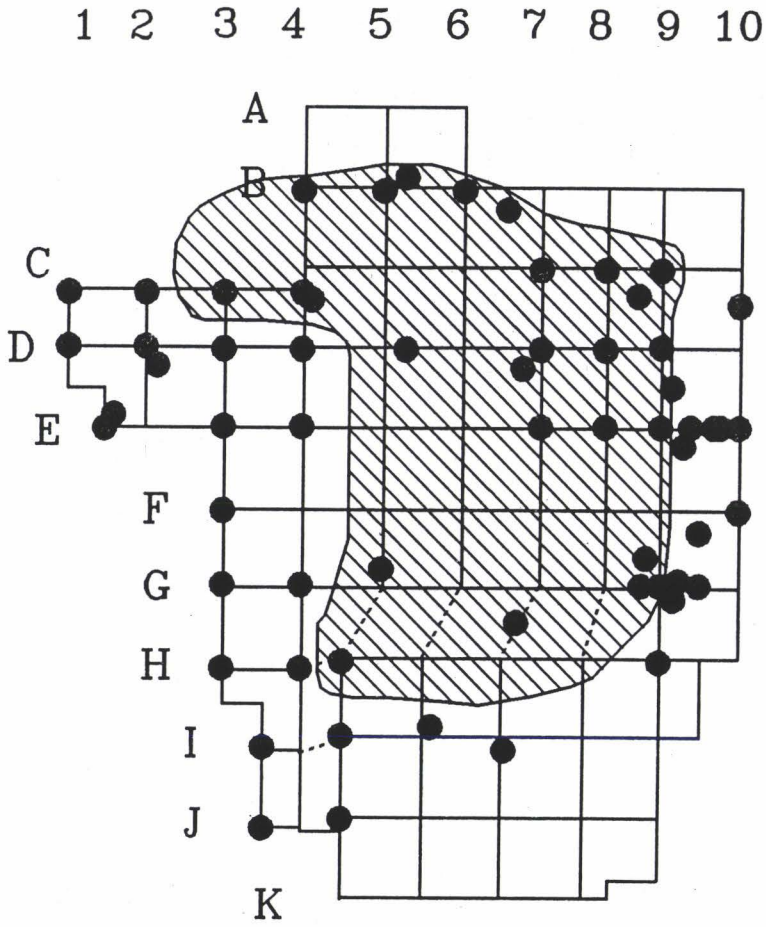
Psoralea lanceolata

Vegetation Survey Plots, 1991



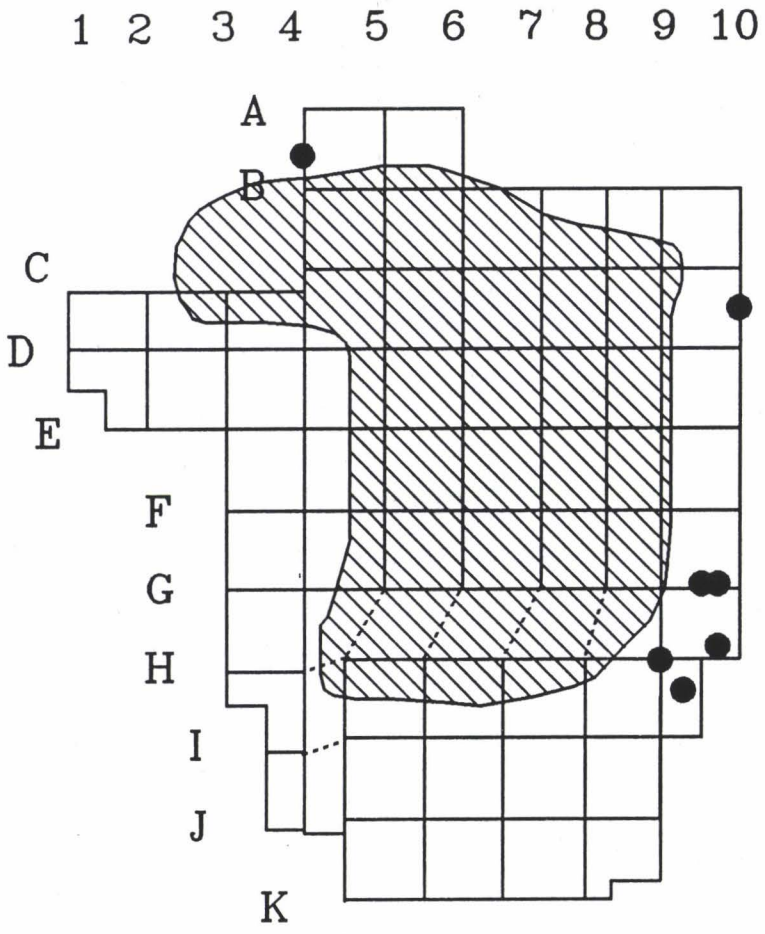
Psuedotsuga menziesii

Vegetation Survey Plots, 1991



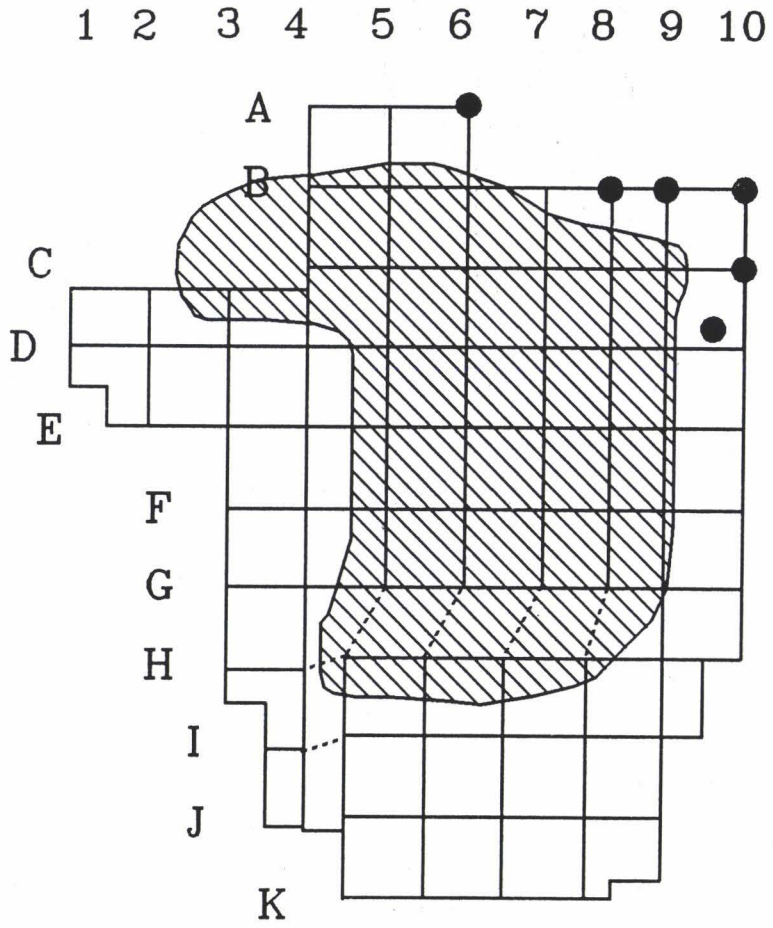
Redfieldia flexuosa

Vegetation Survey Plots, 1991



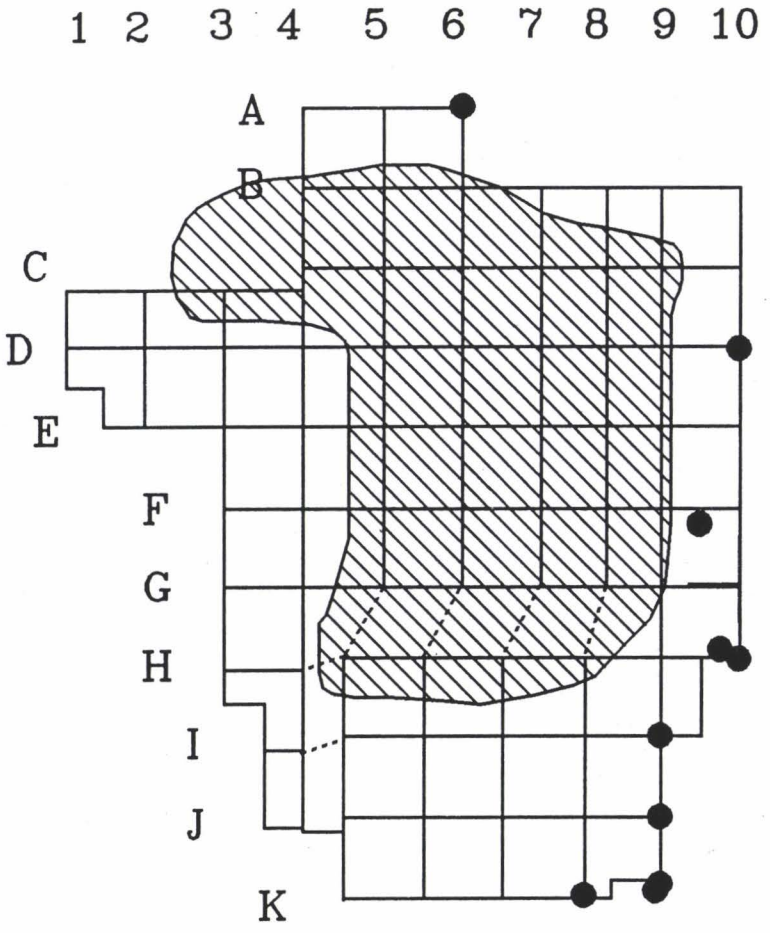
Rhus trilobata

Vegetation Survey Plots, 1991



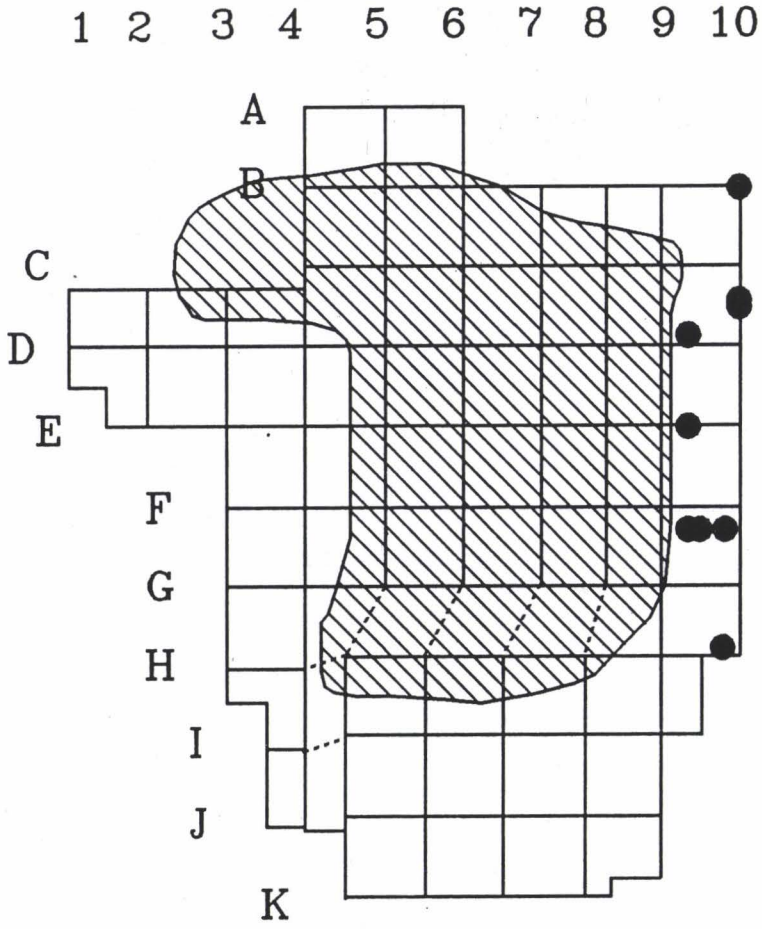
Ribes aureum

Vegetation Survey Plots, 1991



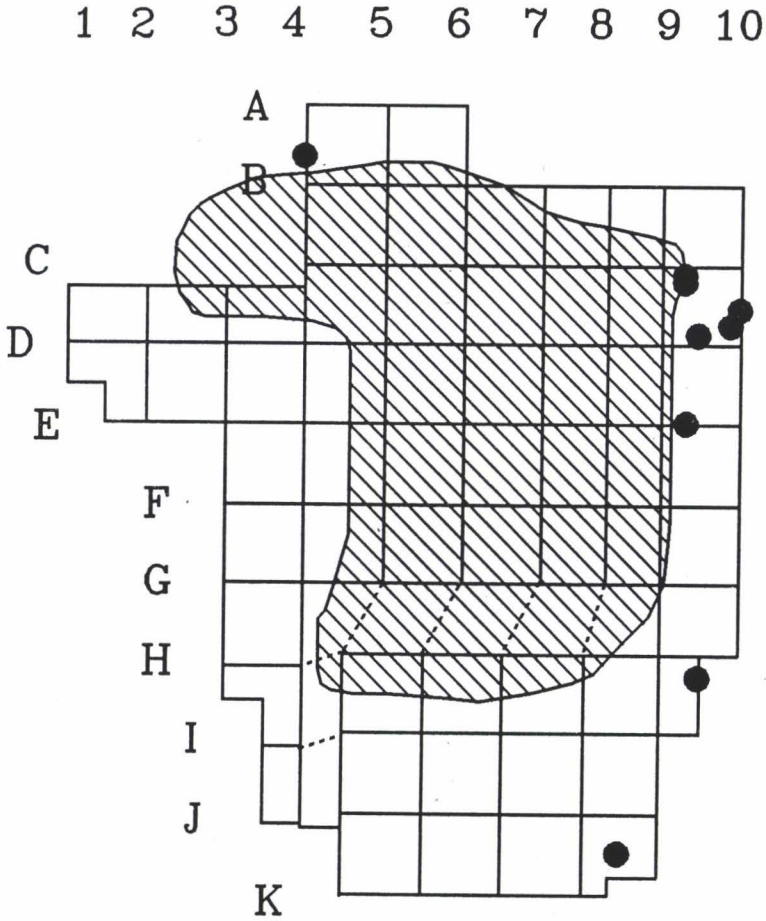
Ribes cereum

Vegetation Survey Plots, 1991



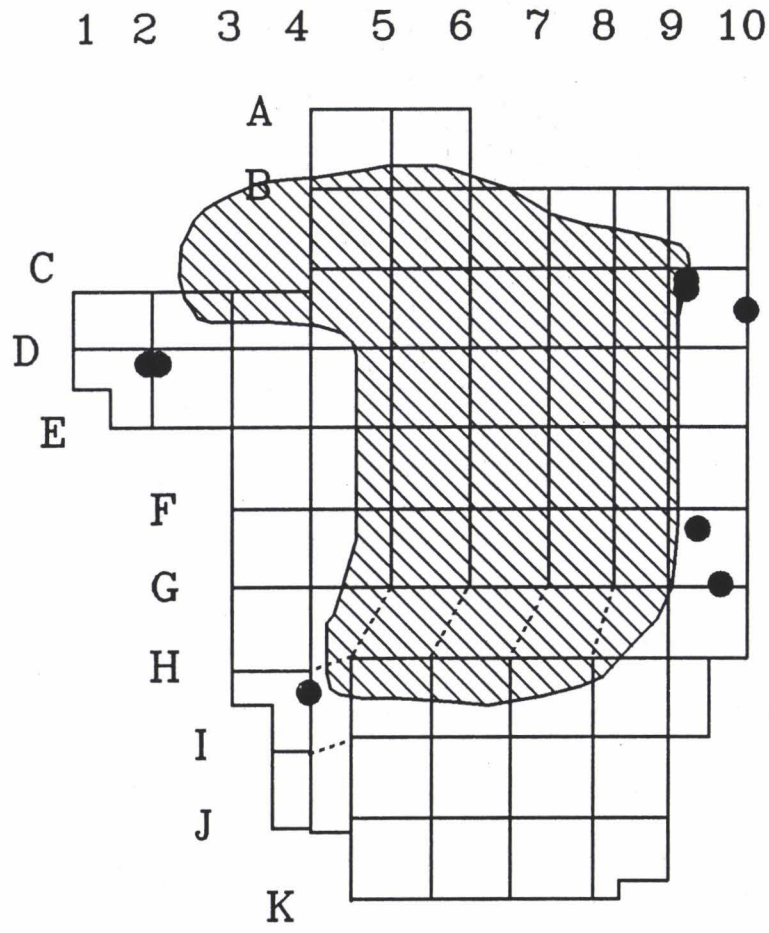
Ribes leptanthum

Vegetation Survey Plots, 1991



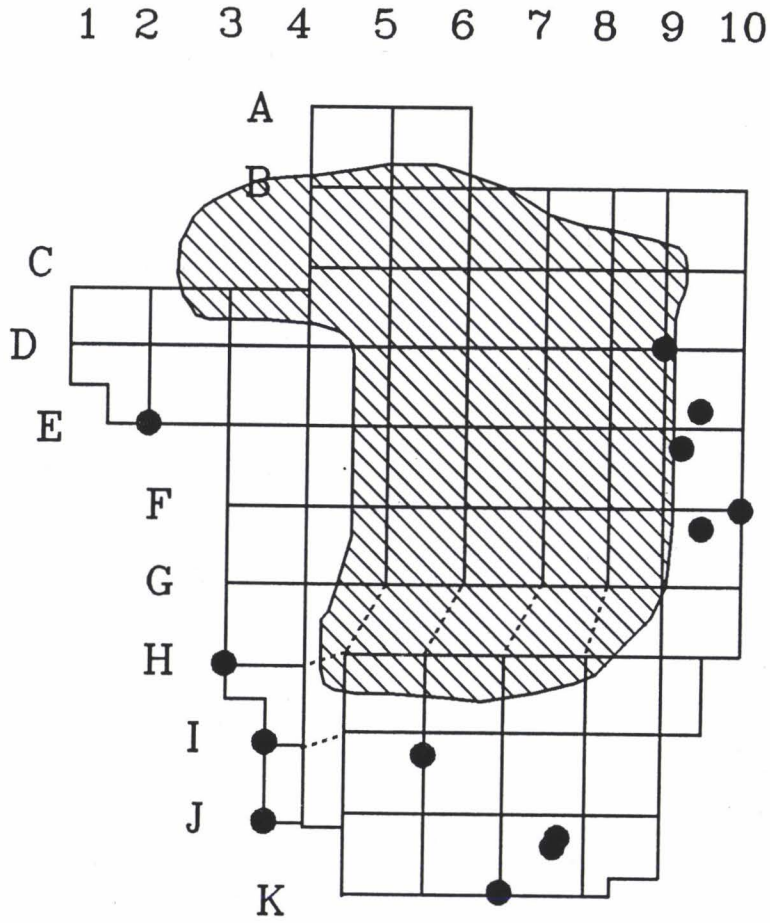
Rosa woodsii

Vegetation Survey Plots, 1991



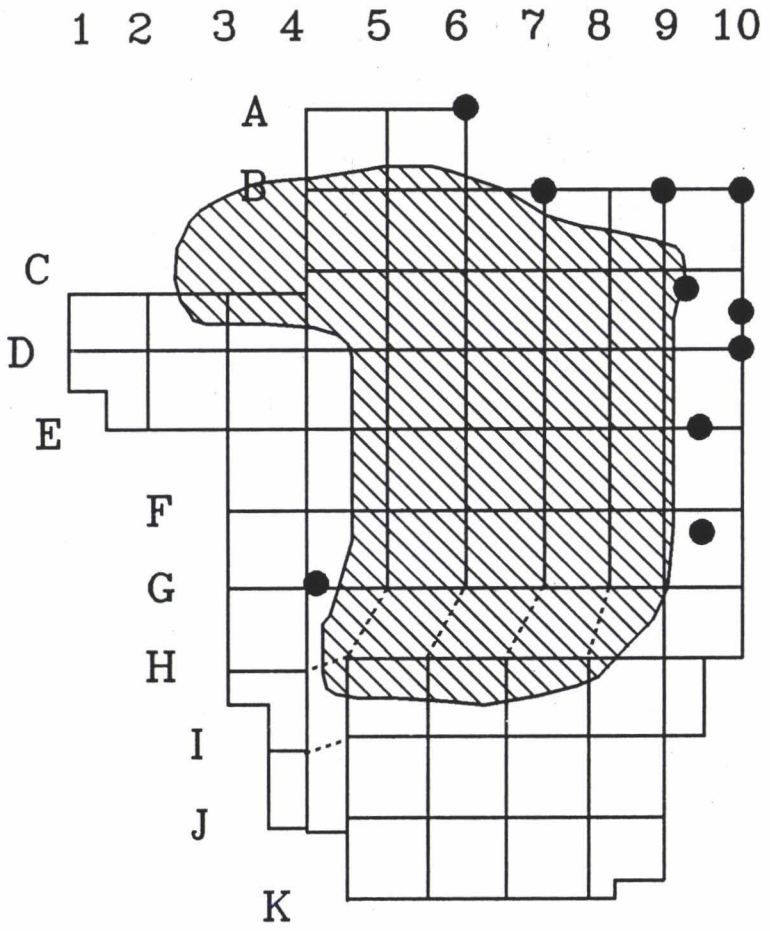
Salix exigua

Vegetation Survey Plots, 1991



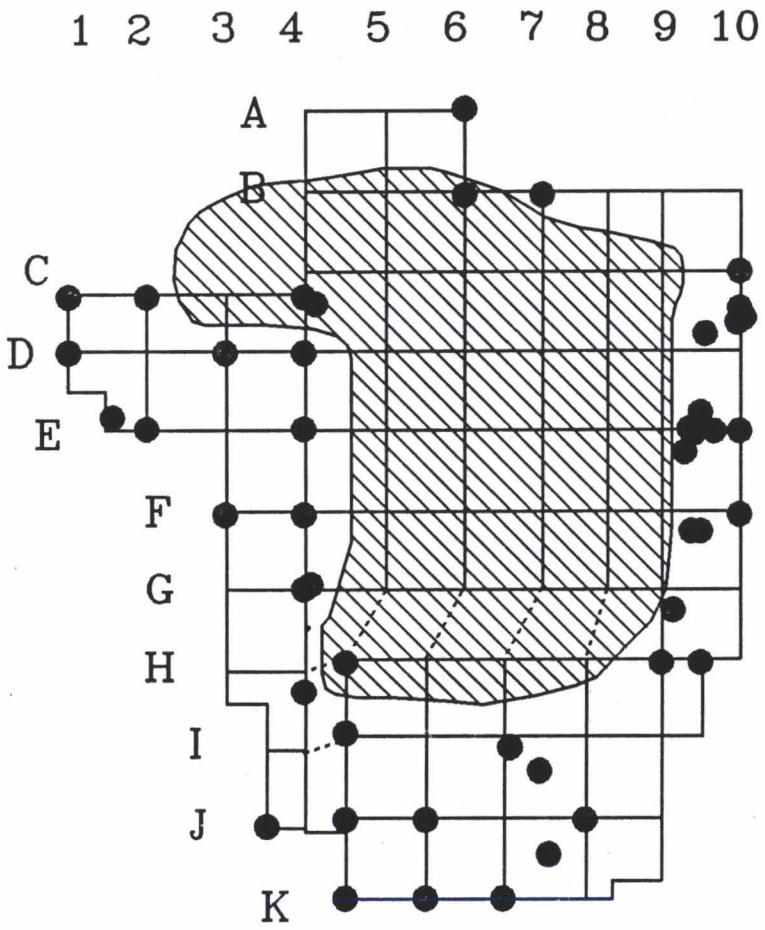
Salsola kali

Vegetation Survey Plots, 1991



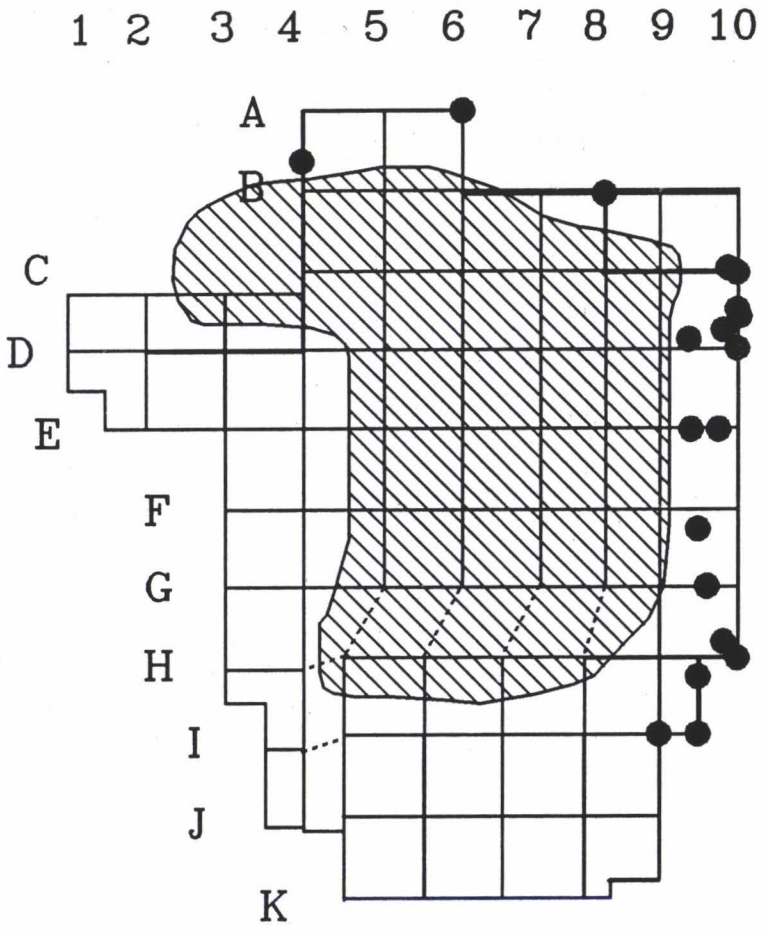
Senecio fendleri

Vegetation Survey Plots, 1991



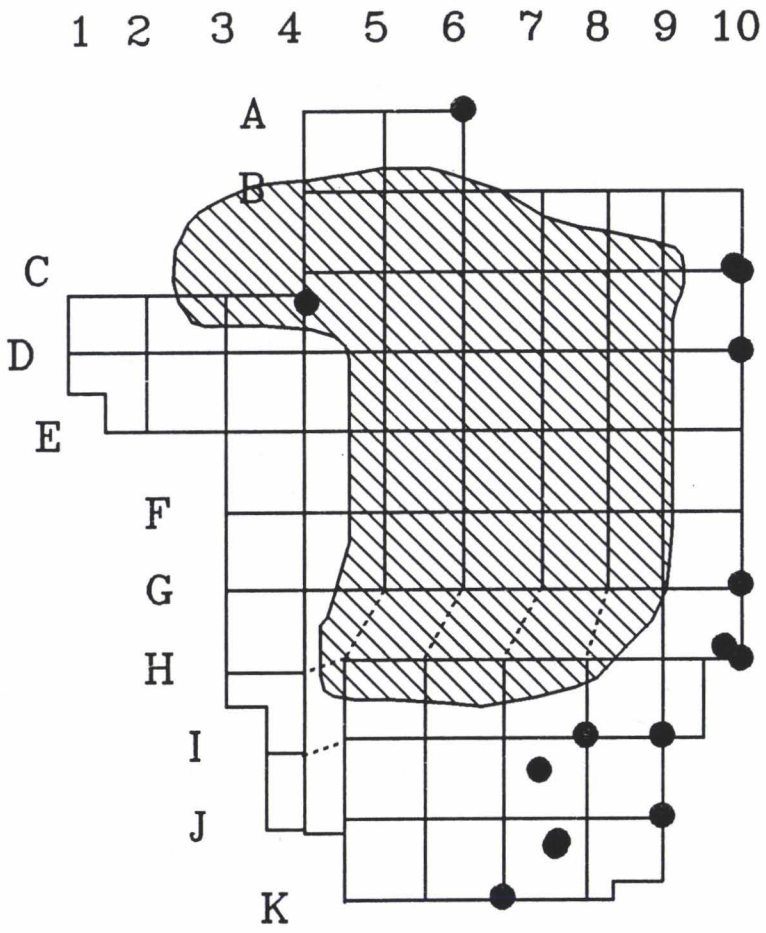
Senecio sparteoides

Vegetation Survey Plots, 1991



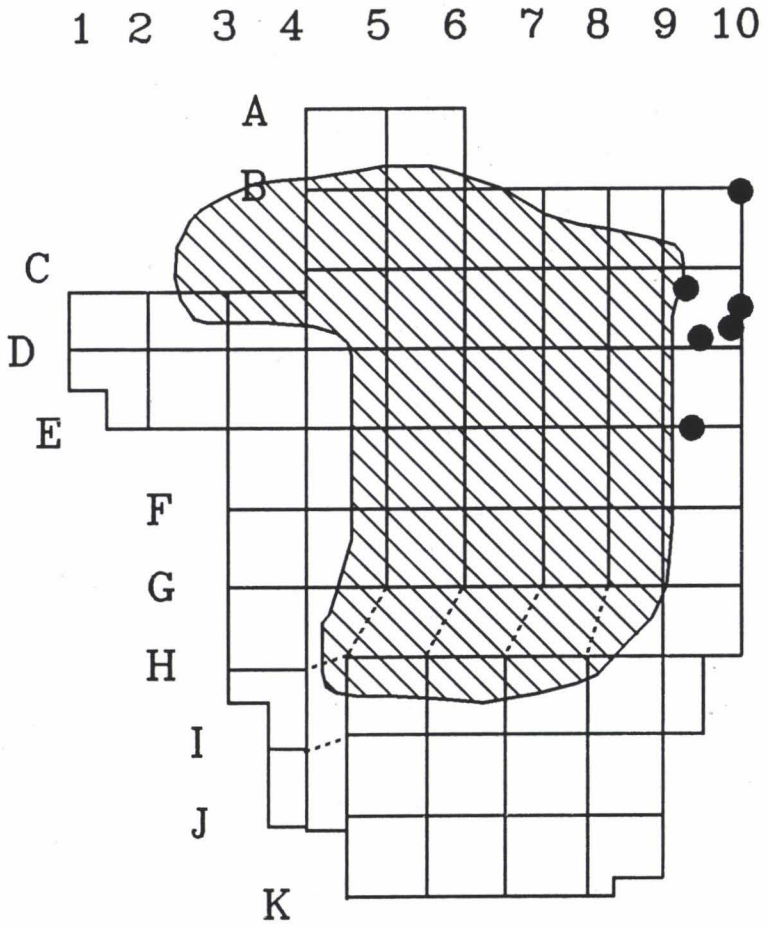
Senecio tridenticulatus

Vegetation Survey Plots, 1991



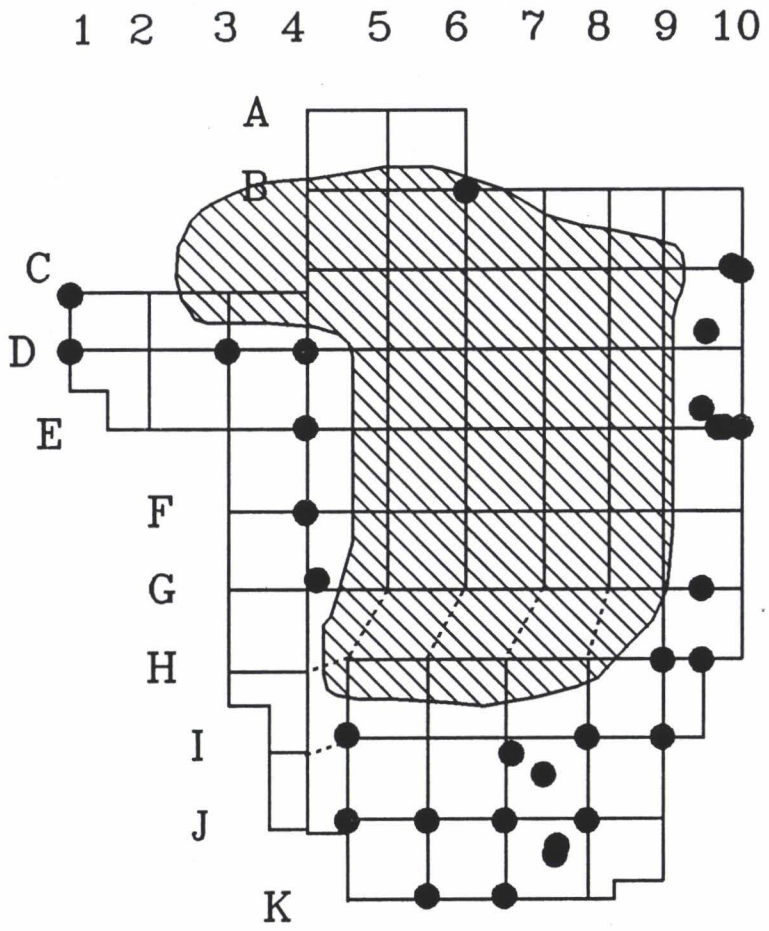
Sitanion hystrix

Vegetation Survey Plots, 1991



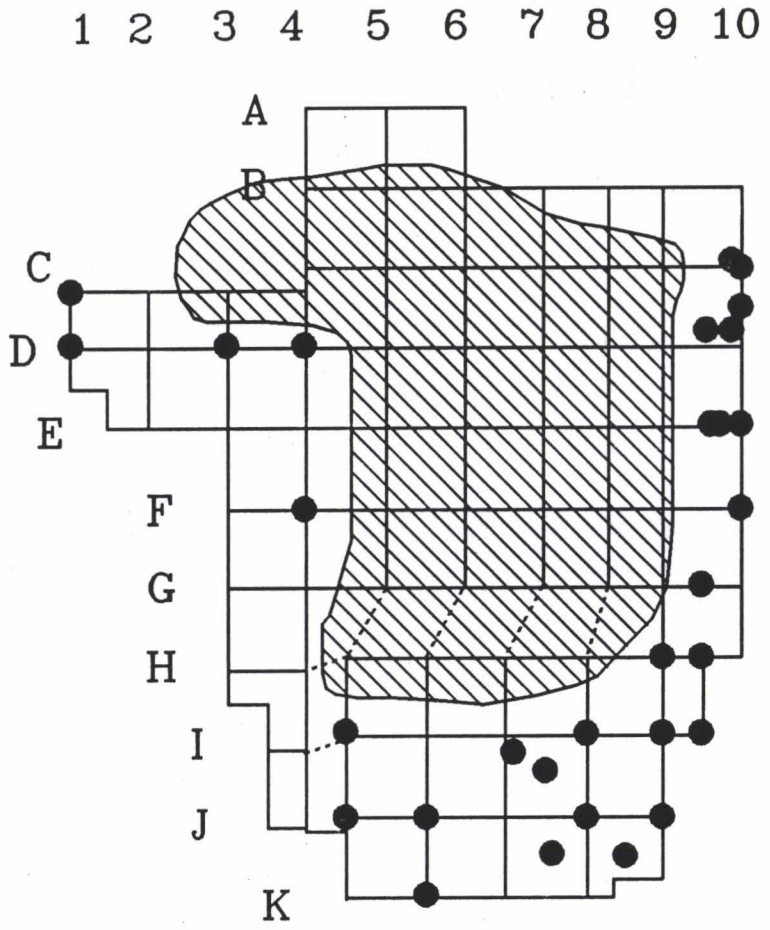
Smilacina stellata

Vegetation Survey Plots, 1991



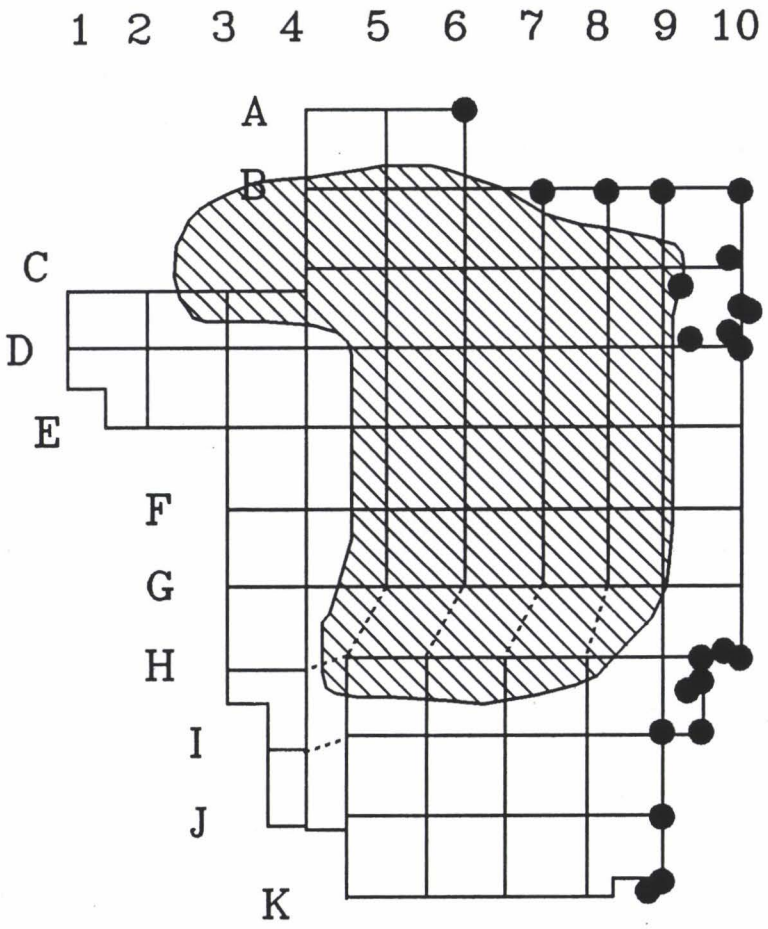
Sporobolus cryptandrus

Vegetation Survey Plots, 1991



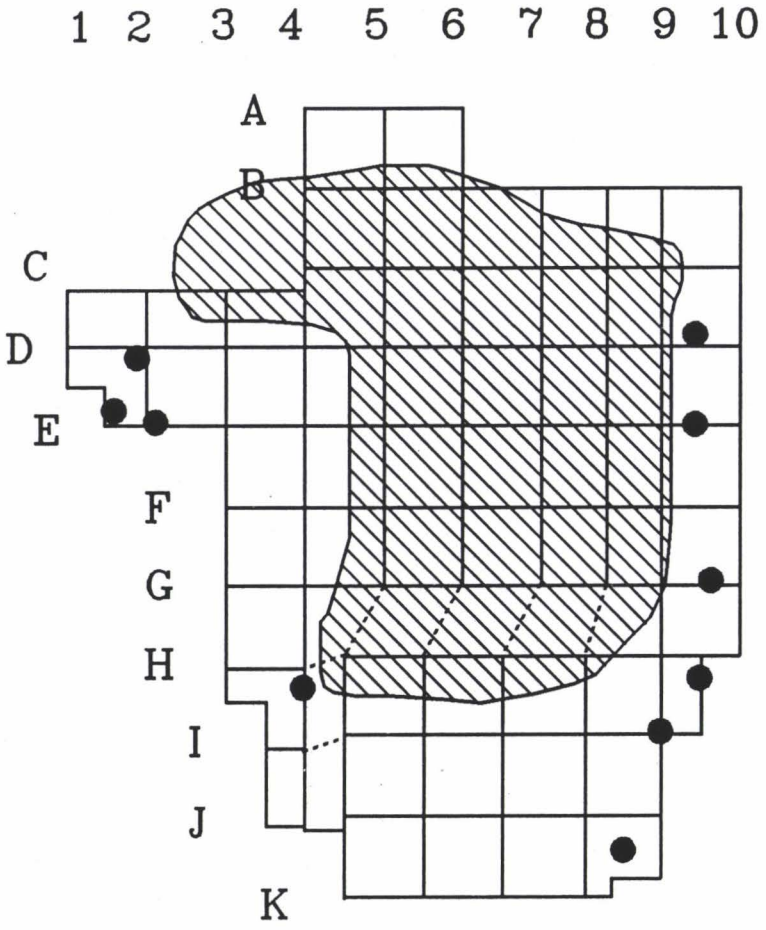
Stipa comata

Vegetation Survey Plots, 1991



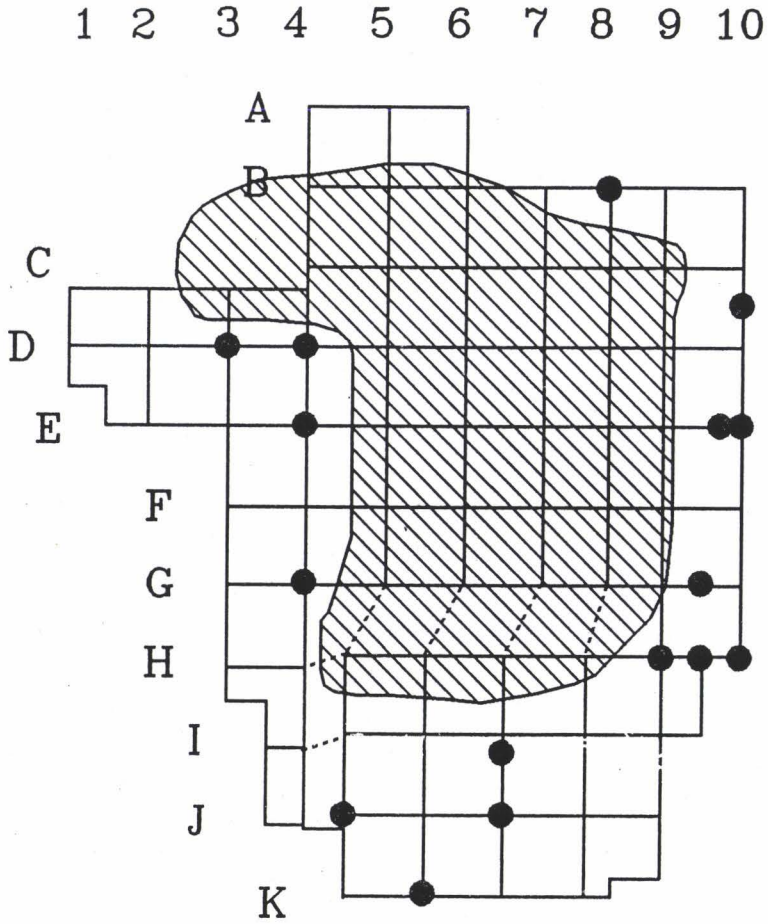
Symphoricarpos oreophilus

Vegetation Survey Plots, 1991



Taraxacum officinale

Vegetation Survey Plots, 1991



Yucca glauca

Vegetation Survey Plots, 1991

Appendix C.--Plot data sheets.

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. A-6 Date 8-28-91 Workers SCS, JEO
Location BRANCHING POINT IN Y-SHAPED RAVINE, 1ST LARGISH CANYON W OF COLD CREEK. NO MARKER FOUND.
ACCESS: UP THE CANYON UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T25S R37W Parent material PRECAMBRIAN METAMORPHICS
Altitude 9040' Slope 40° Exposure 175° Topographic Shading (1-3) 3
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use INACCESSIBLE
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 9036-18

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	+ 1	Androsace septentrionalis	+ 1
Pinus edulis	1 1	Arabis lignifera	+ 1
		Artemisia frigida	1 1
Shrubs		Descurainia pinnata	+ 1
Cercocarpus montanus	1 1	Eriogonum jamesii	+ 1
Echinocerus triglochidiatus	+ 1	Erysimum asperum	+ 1
Holodiscus dumosus	2 1	Eupatorium herbaceum	1 1
Opuntia polycantha	+ 1	Geranium caespitosum	1 1
Ribes aureum	1 1	Gilia aggregata	+ 1
Ribes cereum	2 1	Heterotheca villosa	+ 1
Rubus deliciosus	2 1	Machaeranthera canescens	+ 1
Symphoricarpos oreophilus	1 1	Oxybaphus linearis	+ 1
		Senecio fendleri	+ 1
Graminoids		Senecio spartioides	+ 1
Bouteloua gracilis	+ 1	Senecio tridenticulatus	+ 1
Bromus anomalus	+ 1		
Carex rossii	+ 1		
Koeleria nitida	1 1		
Muhlenbergia montana	+ 1		
Oryzopsis micrantha	2 1		
Sitanion hystrix	+ 1		

COMMUNITY COVER

Tree layer 70 % Shrub layer 60 % Herb layer 40 %
Cryptogamic layer 10 % Litter 50 % Rock (>1cm) 70 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. A.6-4 Date 16 JULY 91 Workers SCS
Location SAND CREEK CAMPGROUND, NEXT TO THE CREEK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T25S R73W Parent Material ALLUVIUM
Altitude 7880' Slope 14° Exposure 30° Topographic Shading (1-3) 1
Vegetation cluster category STREAMBANK
Evidence of historic use CATTLE ESCAPE FROM INHOLDING ACROSS CREEK
Seral stage CLIMAX Condition or trend STABLE
plot photographed yes x negative no. 6700-6

RECONNAISSANCE DATA
cover/sociability

Trees			
Juniperus scopulorum	+ 1		
Populus tremuloides	4 4		
Shrubs			
Alnus tenuifolia	+ 2		
Rhus trilobata	1 1		
Rosa woodsii	3 4		
Rubus idaeus	+ 1		
Graminoids			
Bromus anomalus	1 3		
Calamagrostis canadensis	1 3		
Carex	1 2		
Poa praetensis	+ 1		
Forbs			
Clematis columbiana		1 1	
Equisetum arvense		+ 1	
Geranium richardsonii		+ 1	
Senecio tridenticulatus		+ 1	

COMMUNITY COVER

Tree layer 75 % Shrub layer 60 % Herb layer 10 %
Cryptogamic layer 0 % Litter 100 % Rock (>1cm) 0 % Bare soil 0 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. B-10 Date 8-26-91 Workers SCS, JEO
Location NE PARK CORNER, ON RIDGE SADDLE ABOVE END OF DUNES IN LITTLE MEDANO CREEK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked SURVEY MARKER
Township and Range T25/26S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 8880' Slope 20° Exposure 245° Topographic Shading (1-3) 1
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use MOSTLY INACCESSIBLE
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 9063-3

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Abies concolor	2 1	Arabis hoelboellii	+ 1
Pinus flexilis	2 1	Artemisia drancunculus	+ 1
Pseudotsuga menziesii	2 1	Chenopodium leptophyllum	+ 1
		Descurainia pinnata	+ 1
Shrubs		Erysimum asperum	+ 1
Holodiscus dumosus	2 2	Gilia aggregata	+ 1
Ribes aureum	1 1	Machaeranthera canescens	1 1
Ribes leptanthum	+ 1	Mertensia lanceolata	+ 1
Symphoricarpos oreophilus	1 1	Penstemon comarrhenus	+ 1
		Polygonum douglasii	+ 1
Graminoids		Senecio fendleri	1 1
Bromus anomalus	+ 1	Smilacina stellata	+ 1
Carex rossii	2 1	Solidago sparsiflora	1 1
Festuca ovina	2 3	Thermopsis montana	1 1
Koeleria nitida	+ 1		
Muhlenbergia montana	2 1		

COMMUNITY COVER

Tree layer 50 % Shrub layer 15 % Herb layer 60 %
Cryptogamic layer 1 % Litter 95 % Rock (>1cm) 1 % Bare soil 3 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. B-4 Date 28 AUGUST 91 Workers SCS, JEO, EDM
Location N EDGE OF DUNES NEAR SAND CREEK CAMPGROUND, S OF BURIED FENCE. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T25/26S R12E/73W Parent material AEOLIAN SAND
Altitude 8040' Slope 29° Exposure 65° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 9063-15,16

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Cirsium undulatum	+ 1
		Helianthus petiolarus	1 1
Shrubs		Lygodesmia juncea	+ 1
-none-		Psoralea lanceolata	2 1
Graminoids			
Redfieldia flexuosa	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 55 %
Cryptogamic layer 0 % Litter 40 % Rock (>1cm) 0 % Bare soil 45 %

Cover classes		Sociability classes	
< 1%	+	Growing as single, widely spaced individuals	- 1
1 - 5%	1	Small groups	- 2
6 - 25%	2	In small patches	- 3
26 - 50%	3	Extensive patches	- 4
51 - 75%	4	In nearly pure stands	- 5
76 - 95%	5		
>95%	6		

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. B-5 Date 28 AUGUST 91 Workers SCS, JEO, EDM
Location N EDGE OF DUNES NEAR SAND TRAP. ABOUT 1/4 MI SE OF SAND TRAP #3. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T25S R26/73W Parent material AEOLIAN SAND
Altitude 8160' Slope 14° Exposure 140° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 9063-17

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Helianthus petiolarus	1 1
		Psoralea lanceolata	1 1
Shrubs			
-none-			
Graminoids			
Redfieldia flexuosa	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 35 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 65 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. B-6 Date 6-29-91 Workers SCS, JED
Location N EDGE OF DUNES NEAR COLD CREEK. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T25/26S R73W Parent material AEOLIAN SAND
Altitude 8400' Slope 24° Exposure 5° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend SAND ENCROACHING
plot photographed yes X negative no. 9063-19

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Cirsium undulatum	1 1
		Corispermum nitidum	+ 1
Shrubs		Cryptantha jamesii	+ 1
Chrysothamnus nauseosus	2 1	Eriogonum cernuum	+ 1
		Erysimum asperum	+ 1
Graminoids		Gilia pinnatifida	+ 1
Redfieldia flexuosa	1 1	Helianthus petiolaris	1 1
Oryzopsis hymenoides	+ 1	Heterotheca villosa	1 1
Sporobolus cryptandrus	+ 1	Lygodesmia juncea	1 1
		Machaeranthera canescens	+ 1
		Oenothera coronopifolia	+ 1
		Oenothera pallida	+ 1
		Penstemon angustifolius	+ 1
		Psoralea lanceolata	1 1
		Senecio spartioides	2 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 20 % Herb layer 45 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 55 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. B-7 Date 8-29-91 Workers SCS, EDM, JEO
Location N SIDE OF MTN RIDGE BETWEEN DUNES AND COLD CREEK CANYON. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T25/26S R73W Parent material PRECAMBRIAN METAMORPHICSS, WITH SAND OVERLAY
Altitude 9360' Slope 37° Exposure 310° Topographic Shading (1-3) 3
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use MOSTLY INACCESSIBLE
Seral stage CLIMAX Condition or trend MODERATE. SLOPE INSTABILITY DUE TO SAND
plot photographed yes X negative no. 9063-23

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Abies concolor	2 1	Androsace septentrionalis	+ 1
Pinus flexilis	1 1	Arabis lignifera	+ 1
Pseudotsuga menziesii	2 1	Aster chilensis	+ 1
		Eriogonum alatum	+ 1
Shrubs		Erysimum asperum	+ 1
Chrysothamnus parryi	+ 1	Gilia pinnatifida	+ 1
Symphoricarpos oreophilus	+ 1	Heterotheca villosa	+ 1
		Machaeranthera canescens	+ 1
Graminoids		Penstemon barbatus	+ 1
Carex rossii	+ 1	Penstemon crandallii	+ 1
Poa fendleriana	1 1	Saxifraga bronchialis	+ 1
		Selaginella densa	+ 1
		Senecio fendleri	+ 1
		Senecio spartioides	+ 1
		Thermopsis montana	+ 1

COMMUNITY COVER

Tree layer 35 % Shrub layer 1 % Herb layer 10 %
Cryptogamic layer 20 % Litter 35 % Rock (>1cm) 70 % Bare soil 10 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. B-8 Date 8-29-91 Workers SCS, EDM, JEO
Location N BOUNDARY E OF COLD CREEK, ON RIDGE BETWEEN DUNES AND COLD CREEK CANYON. NO MARKER FOUND
PLOT IS ON RIDGE OF A SOUTHWARD SPUR. UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked LONG IRON ROD
Township and Range T25/26S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 9720' Slope 10° Exposure 180° Topographic Shading (1-3) 1
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use MOSTLY INACCESSIBLE
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 9063-24

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	1 1	Androsace septentrionalis	+ 1
Pinus edulis	2 1	Arabis lignifera	+ 1
Pseudotsuga menziesii	3 1	Artemisia frigida	1 1
		Chenopodium leptophyllum	+ 1
Shrubs		Descurainia pinnata	+ 1
Cercocarpus montanus	2 1	Eriogonum jamesii	+ 1
Chrysothamnus parryi	1 1	Erysimum asperum	+ 1
Holodiscus dumosus	2 1	Gilia aggregata	+ 1
Ribes aureum	1 1	Machaeranthera canescens	+ 1
Symphoricarpos oreophilus	1 1	Mertensia lanceolata	+ 1
Yucca glauca	+ 1	Senecio tridenticulatus	1 1
Graminoids			
Carex rossii	1 1		
Festuca ovina	3 1		
Koeleria nitida	+ 1		
Muhlenbergia montana	1 1		

COMMUNITY COVER

Tree layer 40 % Shrub layer 20 % Herb layer 40 %
Cryptogamic layer 3 % Litter 60 % Rock (>1cm) 20 % Bare soil 10 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. B-9 Date 8-26-91 Workers SCS, JED
Location MOUNTAINS NORTH OF LITTLE MEDANO CREEK. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T25/26S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 9800' Slope 36° Exposure 265° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use MOSTLY INACCESSIBLE
Seral stage CLIMAX Condition or trend FAIR, DUE TO SLOPE INSTABILITY AND BOULDER IMPACTS
plot photographed yes X negative no. 9063-4

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Pinus flexilis	1 1	Arabis hoelboellii	+ 1
Pseudotsuga menziesii	2 1	Artemisia frigida	1 1
		Draba lanceolata	+ 1
Shrubs		Eriogonum jamesii	+ 1
Cercocarpus montanus	1 1	Gilia pinnatifida	+ 1
Ribes aureum	+ 1	Heterotheca villosa	1 1
Symphoricarpos oreophilus	1 1	Penstemon crandallii	1 1
		Psoralea lanceolata	1 1
Graminoids		Senecio fendleri	+ 1
Carex rossii	+ 1		
Festuca ovina	1 1		
Koeleria nitida	+ 1		
Muhlenbergia montana	+ 1		

COMMUNITY COVER

Tree layer 30 % Shrub layer 10 % Herb layer 40 %
Cryptogamic layer 30 % Litter 50 % Rock (>1cm) 50 % Bare soil 5 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C-10 Date 8-26-91 Workers SCS, JEO
Location ABOVE DRY WASH BETWEEN MEDANO AND LITTLE MEDANO CREEKS. SURVEY MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked SURVEY MARKER
Township and Range T26S R73W Parent material COLLUVIUM WITH SAND
Altitude 8920' Slope 31° Exposure 135° Topographic Shading (1-3) 2
Vegetation cluster category SAND-MOUNTAINSIDE
Evidence of historic use ACCESSIBLE FROM BELOW
Seral stage CLIMAX Condition or trend GOOD. SOME SLOPE INSTABILITY
plot photographed yes X negative no. 9063-1

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	+ 1	Artemisia carruthii	+ 1
		Artemisia frigida	2 1
Shrubs		Bahia dissecta	+ 1
Cercocarpus montanus	2 1	Chaenactis douglasii	+ 1
Chrysothamnus nauseosus	+ 1	Chenopodium leptophyllum	+ 1
Holodiscus dumosus	1 1	Cryptantha fendleri	+ 1
Opuntia polycantha	+ 1	Descurainia pinnata	1 1
Ribes aureum	+ 1	Eriogonum cernuum	1 1
		Eriogonum jamesii	1 1
Graminoids		Erysimum asperum	+ 1
Bouteloua gracilis	+ 1	Eupatorium herbaceum	+ 1
Bromus anomalus	1 1	Gilia pinnatifida	+ 1
Bromus tectorum	+ 1	Heterotheca villosa	1 1
Carex rossii	+ 1	Lappula redowskii	+ 1
Festuca ovina	+ 1	Machaeranthera canescens	+ 1
Oryzopsis hymenoides	+ 1	Oenothera caespitosa	+ 1
Sitanion hystrix	+ 1	Senecio spartioides	1 1
Sporobolus cryptandrus	+ 1	Senecio tridenticulatus	+ 1
Stipa comata	+ 1		

COMMUNITY COVER

Tree layer + % Shrub layer 30 % Herb layer 50 %
Cryptogamic layer 40 % Litter 50 % Rock (>1cm) 40 % Bare soil 10 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C-10A Date 6-26-91 Workers ACB, SCS, GJ
Location N OF DRY WASH BETWEEN MEDANO AND LITTLE MEDANO CREEKS. PROBABLY 200M W OF PLOT C-10
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material PRECAMBRIAN METAMORPHICS WITH SAND
Altitude 9000' Slope 30° Exposure 320° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2859-19

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Pinus edulis	2 1	Artemisia frigida	1 1
		Cerastium arvense	+ 1
Shrubs		Descurainia richardsonii	+ 1
Cercocarpus montanus	2 1	Eriogonum jamesii	1 1
Holodiscus dumosus	1 1	Erysimum asperum	+ 1
Opuntia polycantha	2 1	Gilia pinnatifida	+ 1
Symphoricarpos oreophilus	+ 1	Heterotheca villosa	1 1
		Lithospermum incisum	+ 1
Graminoids		Machaeranthera canescens	+ 1
Bouteloua gracilis	1 1	Senecio tridenticulatus	+ 1
Carex rossii	1 1		
Carex stenophylla	+ 1		
Muhlenbergia montana	2 1		
Oryzopsis hymenoides	+ 1		
Sitanion hystrix	+ 1		
Sporobolus cryptandrus	+ 1		
Stipa comata	+ 1		

COMMUNITY COVER

Tree layer 5 % Shrub layer 10 % Herb layer 25 %
Cryptogamic layer 5 % Litter 10 % Rock (>1cm) 70 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C-7 Date 6-26-91 Workers SCS, EDM, JEO
Location NE DUNES. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8680' Slope 13° Exposure 185° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. edm slide #37

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 2 2

Forbs
Helianthus petiolaris + 1
Lygodesmia juncea + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 10 %
Cryptogamic layer 0 % Litter + % Rock (>1cm) 0 % Bare soil 90 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C-8 Date 6-26-91 Workers SCS, EDM, JED
Location NE EDGE OF DUNES. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8800' Slope 6° Exposure 220° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2834-36

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Oryzopsis hymenoides + 1
Redfieldia flexuosa 1 1

Forbs
Cirsium undulatum + 1
Corispermum nitidum + 1
Helianthus petiolaris + 1
Psoralea lanceolata 2 3

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 35 %
Cryptogamic layer 0 % Litter + % Rock (>1cm) 0 % Bare soil 65 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C-9 Date 6-26-91 Workers SCS, EDM, JEO
Location SMALL HILL OVERLOOKING NE EDGE OF DUNES. SECTION CORNER MARKED BY STONE PILE
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material ALLUVIUM WITH SAND
Altitude 8720' Slope 7° Exposure 175° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use ACCESSIBLE TO LIVESTOCK
Seral stage EARLY Condition or trend GOOD. VEGETATION AFFECTED BY SAND
plot photographed yes X negative no. 2834-35

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Cirsium undulatum	+ 1
		Corispermum nitidum	+ 1
Shrubs		Helianthus petiolaris	+ 1
-none-		Lygodesmia juncea	+ 1
		Oenothera coronopifolia	+ 1
Graminoids		Penstemon angustifolius	+ 1
Oryzopsis hymenoides	+ 1	Psoralea lanceolata	1 1
Redfieldia flexuosa	+ 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 6 %
Cryptogamic layer 0 % Litter 1 % Rock (>1cm) 40 % Bare soil 53 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.2-1 Date 6-20-91 Workers SCS, ACB, GJ, CO
Location FENCE CORNER W OF SAND CREEK. PLOT IS 60 METERS SE OF SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7720' Slope 1° Exposure 280° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-32

RECONNAISSANCE DATA
cover/sociability

Trees			Forbs	
-none-			Ambrosia acanthicarpa	+ 1
			Astragalus ceramicus	+ 1
Shrubs			Chenopodium leptophyllum	+ 1
Chrysothamnus nauseosus	3	1	Crypthantha fendleri	+ 1
			Descurainia richardsonii	1 1
Graminoids			Erysimum asperum	+ 1
Oryzopsis hymenoides	1	1	Gilia longiflora	+ 1
Redfieldia flexuosa	3	1	Helianthus petiolaris	1 1
Sporobolus cryptandrus	+	1	Oenothera coronopifolia	+ 1
Stipa comata	2	1	Psoralea lanceolata	2 1
			Senecio spartioides	1 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 28 % Herb layer 50 %
Cryptogamic layer 0 % Litter 40 % Rock (>1cm) 0 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.2-2 Date 6-20-91 Workers SCS, ACB, GJ, CO
Location FAR WESTERN DUNES. FENCELINE, BUT NO SURVEY MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7720' Slope 8° Exposure 110° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-33

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Corispermum nitidum	+ 1
		Cryptantha fendleri	+ 1
Shrubs		Helianthus petiolaris	2 1
Chrysothamnus nauseosus	+ 1	Lygodesmia juncea	1 1
		Oenothera coronopifolia	+ 1
Graminoids		Psoralea lanceolata	3 1
Oryzopsis hymenoides	3 1	Senecio spartioides	+ 1
Redfieldia flexuosa	2 1	Tragopogon dubius	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer + % Herb layer 55 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.2-3 Date 6-22-91 Workers SCS, ACB, GJ, CD
Location FAR WESTERN DUNES. MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R17E Parent material AEOLIAN SAND
Altitude 7760' Slope 9° Exposure 260° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2834-14

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Corispermum nitidum	+ 1
		Helianthus petiolaris	1 1
Shrubs		Lygodesmia juncea	+ 1
Chrysothamnus nauseosus	+ 1	Psoralea lanceolata	3 1
Graminoids			
Oryzopsis hymenoides	2 1		
Redfieldia flexuosa	1 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer + % Herb layer 35 %
Cryptogamic layer 0 % Litter 5 % Rock (>1cm) 0 % Bare soil 60 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.2-4 Date 6-22-91 Workers SCS, ACB, GJ, CO
Location FAR WESTERN DUNES. MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N/26S R12E/73W Parent material AEOLIAN SAND
Altitude 7880' Slope 12° Exposure 180° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2834-10

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Corispermum nitidum	+ 1
		Helianthus petiolaris	+ 1
Shrubs		Lygodesmia juncea	2 1
Chrysothamnus nauseosus	2 1	Machaeranthera canescens	+ 1
		Orobanche multiflora	+ 1
Graminoids		Psoralea lanceolata	+ 1
Oryzopsis hymenoides	2 1	Senecio spartioides	+ 1
Redfieldia flexuosa	+ 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 20 % Herb layer 40 %
Cryptogamic layer 0 % Litter 15 % Rock (>1cm) 0 % Bare soil 45 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.2-4A Date 6-22-91 Workers SCS, ACB, GJ, CO
Location FAR WESTERN DUNES. SIDES OF A DEEP PIT, CA. 0.1 MI S OF CORNER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R12E/73W Parent material AEOLIAN SAND
Altitude 7880' Slope 32° Exposure 25° Topographic Shading (1-3) 3
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend MODERATE DUE TO SLOPE INSTABILITY
plot photographed yes X negative no. 2834-11

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Artemisia drancunculus	1 1
		Crypthantha jamesii	+ 1
Shrubs		Eriogonum cernuum	+ 1
Chrysothamnus nauseosus	2 1	Erysimum asperum	+ 1
		Helianthus petiolaris	+ 1
Graminoids		Lygodesmia juncea	+ 1
Oryzopsis hymenoides	3 1	Machaeranthera canescens	+ 1
Redfieldia flexuosa	1 1	Orobanche multiflora	+ 1
Sitanion hystrix	2 1	Psoralea lanceolata	2 1
		Senecio spartioides	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 24 % Herb layer 70 %
Cryptogamic layer 0 % Litter 50 % Rock (>1cm) 0 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.2-9.3N Date 6-26-91 Workers ACB, GJ, CO
Location CROSSING AT LITTLE MEDANO CREEK, N BANK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape 4 X 25 M How marked STEEL PEG
Township and Range T26S R73W Parent material SAND, WITH SOME ALLUVIAL ROCKS
Altitude 8640' Slope 28° Exposure 180° Topographic Shading (1-3) 1
Vegetation cluster category STREAMBANK
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2859-21,22

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Populus angustifolia	3 1	Cardamine cordifolia	1 2
Populus tremuloides	5 1	Clematis columbiana	1 1
		Equisetum arvense	5 4
Shrubs		Geranium richardsonii	+ 1
Alnus tenuifolia	2 1	Habenaria hyperborea	+ 1
Lonicera involuncrata	+ 1	Hackelia floribunda	+ 1
Prunus virginiana	1 1	Mertensia ciliata	+ 1
Rosa woodsii	2 1	Osmorrhiza depauperata	+ 1
Salix exigua	1 1		
Graminoids			
Agrostis stolonifera	1 1		

COMMUNITY COVER

Tree layer 90 % Shrub layer 60 % Herb layer 80 %
Cryptogamic layer 5 % Litter 90 % Rock (>1cm) 10 % Bare soil 10 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.2-9.3S Date 6-26-91 Workers ACB, GJ, CO
Location CROSSING ON LITTLE MEDANO CREEK, S BANK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape 4 X 25 M How marked STEEL PEG
Township and Range T26S R73W Parent material SAND, WITH SOME ALLUVIAL BOULDERS
Altitude 8640' Slope 18° Exposure 330° Topographic Shading (1-3) 1
Vegetation cluster category STREAMBANK
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2859-23

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Abies concolor	+ 1	Androsace septentrionalis	+ 1
Populus angustifolia	1 1	Arabis drummondii	+ 1
Populus tremuloides	4 1	Cardamine cordifolia	+ 2
		Equisetum arvense	3 4
Shrubs		Geranium richardsonii	+ 1
Alnus tenuifolia	2 1	Heterotheca villosa	+ 1
Rosa woodsii	2 3	Ligusticum porteri	+ 1
Salix exigua	1 3	Senecio fendleri	+ 2
Symphoricarpos oreophilus	+ 1	Smilacina stellata	+ 2
		Thalictrum fendleri	1 1
Graminoids		Urtica dioica	+ 1
Agrostis stolonifera	+ 1		
Calamagrostis canadensis	1 1		

COMMUNITY COVER

Tree layer 70 % Shrub layer 40 % Herb layer 60 %
Cryptogamic layer 10 % Litter 80 % Rock (>1cm) 0 % Bare soil 5 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.5-10 Date 6-25-91 Workers ACB, SCS, GJ, CO
Location E BOUNDARY NEAR MEDANO CREEK, ON FORESTED DUNE PARALLEL TO STREAM. PLOT IS 10 M W OF SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8640' Slope 10° Exposure 150° Topographic Shading (1-3) 1
Vegetation cluster category MIXED
Evidence of historic use WILL HAVE BEEN HEAVILY GRAZED BEFORE PARK
Seral stage LATE Condition or trend GOOD. A LITTLE SAND INSTABILITY
plot photographed yes X negative no. 2834-31

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Abies concolor	2 1	Artemisia frigida	1 1
Pinus ponderosa	+ 1	Astragalus ceramicus	+ 1
Populus angustifolia	2 1	Cirsium undulatum	+ 1
		Erysimum asperum	+ 1
Shrubs		Gilia aggregata	+ 1
Symphoricarpos oreophilus	+ 1	Heterotheca villosa	+ 1
Chrysothamnus nauseosus	+ 1	Penstemon angustifolius	+ 1
Yucca glauca	+ 1	Senecio fendleri	+ 1
		Senecio spartioides	+ 1
Graminoids		Senecio tridenticulatus	+ 1
Agropyron smithii	1 1	Smilacina stellata	+ 1
Calamovilfa longifolia	2 1		
Carex pennsylvanica spp. heliophila	1 1		
Festuca ovina	1 1		
Redfieldia flexuosa	+ 1		

COMMUNITY COVER

Tree layer 25 % Shrub layer 2 % Herb layer 30 %
Cryptogamic layer 0 % Litter 70 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.5-10A Date 6-25-91 Workers SCS, ACB, GLJ, CO
Location N OF MEDANO PASS RD AT E BOUNDARY
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material SANDY ALLUVIUM
Altitude 8560' Slope 10° Exposure 5° Topographic Shading (1-3) 1
Vegetation cluster category STREAMBANK-MOUNTAINSIDE
Evidence of historic use WILL HAVE BEEN HEAVILY GRAZED BEFORE PARK
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2834-33

RECONNAISSANCE DATA
cover/sociability

Trees			**Forbs**		
Populus angustifolia	4	1	Chenopodium leptophyllum	+	1
			Cirsium undulatum	+	1
Shrubs			Crepis runcinata	+	1
Rhus trilobata	1	1	Euphorbia robusta	+	1
Ribes leptanthum	1	1	Galium boreale	1	1
Rosa woodsii	2	1	Senecio spartioides	+	1
Symphoricarpos oreophilus	3	1	Senecio tridenticulatus	1	1
			unk	+	1
Graminoids					
Bromus anomalus	1	1			
Carex	+	1			
Oryzopsis micrantha	1	1			
Poa pratensis	3	1			
Stipa comata	2	1			

COMMUNITY COVER

Tree layer 60 % Shrub layer 55 % Herb layer 55 %
Cryptogamic layer 0 % Litter 95 % Rock (>1cm) 0 % Bare soil 5 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.5-10B Date 8-24-91 Workers SCS, JEO
Location MEDANO CREEK AT THE E BOUNDARY. PLOT IS ON AN ISLAND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material ALLUVIUM
Altitude 8520' Slope 6° Exposure 180° Topographic Shading (1-3) 2
Vegetation cluster category STREAMBANK
Evidence of historic use MANY ADVENTIVES IN VEGETATION DUE TO SEVERE GRAZING BEFORE PARK ESTABLISHMENT
Seral stage CLIMAX Condition or trend MODERATE. WEEDS MAY DECREASE SLOWLY WITH TIME
plot photographed yes X negative no. 9063-0

RECONNAISSANCE DATA
cover/sociability

Trees		Aster hesperius	1 1
-none-		Cerastium nutans	+ 1
		Cirsium arvense	1 1
Shrubs		Cirsium parryi	+ 1
Alnus tenuifolia	3 4	Conyza canadensis	+ 1
Potentilla fruiticosa	+ 1	Epilobium glandulosum	+ 1
Ribes leptanthum	+ 1	Equisetum arvense	+ 1
Rubus ideaus	+ 1	Geranium richardsonii	+ 1
Salix bebbiana	1 3	Geum macrophyllum	+ 1
Salix exigua	2 4	Heracleum lanatum	+ 1
		Mentha arvensis	+ 1
Graminoids		Mertensia ciliata	+ 1
Agrostis stolonifera	2 4	Oenothera strigosa	+ 1
Carex nebraskensis	1 1	Oxytropus sericea	+ 1
Juncus arcticus	2 1	Plantago major	+ 1
Juncus ensifolius	+ 1	Rudbeckia hirta	+ 1
		Rudbeckia laciniata	1 1
Forbs		Rumex acetosella	+ 1
Achillea lanulosa	+ 1	Scrophularia lanceolata	+ 1
Antennaria rosea	+ 3	Senecio eremophilus	+ 1
Artemisia drancunculus	+ 1	Senecio spartioides	+ 1
Artemisia frigida	+ 1	Trifolium repens	+ 1
Aster chilensis	+ 1	Urtica dioica	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 75 % Herb layer 95 %
Cryptogamic layer 2 % Litter 99 % Rock (>1cm) 5 % Bare soil 1 %

Cover classes		Sociability classes	
< 1%	+	Growing as single, widely spaced individuals	- 1
1 - 5%	1	Small groups	- 2
6 - 25%	2	In small patches	- 3
26 - 50%	3	Extensive patches	- 4
51 - 75%	4	In nearly pure stands	- 5
76 - 95%	5		
>95%	6		

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.8-9.6 Date 6-26-91 Workers ACB, GJ, CO
Location 1/4 MI? S OF HAWTHORNE PATCH
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material ALLUVIUM, SAND
Altitude 8560? Slope 6° Exposure 190° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATER Condition or trend GOOD
plot photographed yes X negative no. 2859-20

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	+ 1
		Cryptantha fendleri	1 1
Shrubs		Descurainia richardsonii	+ 1
Ceratoides lanata	2 1	Eriogonum cernuum	+ 1
Chrysothamnus nauseosus	2 1	Gayophytum diffusum ssp. parviflorum	+ 1
Chrysothamnus viscidiflorus	2 1	Lygodesmia juncea	+ 1
Opuntia polycantha	+ 1	Senecio spartioides	1 1
Ribes aureum	3 1		
Graminoids			
Agropyron trachycaulum	1 1		
Bouteloua gracilis	+ 1		
Oryzopsis hymenoides	2 1		
Sporobolus cryptandrus	2 1		
Stipa comata	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 60 % Herb layer 50 %
Cryptogamic layer 0 % Litter 40 % Rock (>1cm) 2 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.8-9.9 Date 6-25-91 Workers ACB, SCS, GJ, CO
Location HAWTHORNE PATCH NEAR THE MOUTH OF MEDANO CREEK CANYON
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material ALLUVIUM, SAND
Altitude 8560' Slope 2° Exposure 330° Topographic Shading (1-3) 1
Vegetation cluster category MIXED
Evidence of historic use
Seral stage LATER Condition or trend GOOD
plot photographed yes X negative no. 2834-29,30

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Artemisia carruthii	1 1
		Artemisia frigida	+ 1
Shrubs		Chenopodium fremontii	+ 1
Chrysothamnus nauseosus	1 1	Chenopodium leptophyllum	+ 1
Crateagus rivularis	3 1	Cirsium undulatum	+ 1
Opuntia polycantha	1 1	Cryptantha fendleri	+ 1
Rosa woodsii	+ 1	Descurainia richardsonii	+ 1
Symphoricarpos oreophilus	2 1	Equisetum laevigatum	+ 1
		Gayophytum diffusum	+ 1
Graminoids		Lactuca tatarica	+ 1
Agropyron smithii	3 1	Senecio tridenticulatus	1 1
Bouteloua gracilis	1 1	Smilacina stellata	+ 1
Bromus anomalus	+ 1	Tragopogon dubius	+ 1
Oryzopsis hymenoides	1 1		
Oryzopsis micrantha	1 1		
Poa fendeleriana	1 1		
Poa pratensis	1 1		
Stipa comata	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 55 % Herb layer 70 %
Cryptogamic layer 0 % Litter 60 % Rock (>1cm) 0 % Bare soil 15 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. C.9-9.4 Date 6-25-91 Workers SCS, ACB, GJ, CO
Location MEDANO CREEK CROSSING, MEDANO PASS RD. N BANK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material ALLUVIUM AND SAND
Altitude 8440' Slope 2° Exposure 40° Topographic Shading (1-3) 1
Vegetation cluster category STREAMBANK
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2834-32

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	1 1	Achillea lanulosa	+ 1
Pinus ponderosa	2 1	Allium cernuum	+ 1
Populus tremuloides	4 1	Aster chilenis	+ 1
		Campanula parryi	+ 1
Shrubs		Chenopodium fremontii	+ 1
Alnus tenuifolia	1 1	Descurainia richardsonii	+ 1
Prunus virginiana	+ 1	Equisetum arvense	3 1
Ribes leptanthum	2 1	Hackelia floribunda	+ 1
Rosa woodsii	3 1	Humulus lupulus ssp. americanus	+ 1
Rubus idaes ssp. melanolasius	+ 1	Rudbeckia laciniata	+ 1
Symphoricarpos oreophilus	+ 1	Scrophularia lanceolata	+ 1
		Senecio eremophilus	+ 1
Graminoids		Senecio tridenticulatus	+ 1
Agropyron trachycaulum	+ 1	Smilacina stellata	2 1
Bromus anomalus	+ 1	Taraxacum officinale	+ 1
Bromus ciliatus	+ 1	Thermopsis montana	+ 1
Juncus balticus	1 1		
Poa pratensis	2 1		

COMMUNITY COVER

Tree layer 60 % Shrub layer 40 % Herb layer 60 %
Cryptogamic layer 0 % Litter 80 % Rock (>1cm) 2 % Bare soil 5 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-1 Date 6-20-91 Workers ACB, SCS, GJ, CO
Location WESTERN BOUNDARY, W OF SAND CREEK. NO FENCE OR MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R17E Parent material AEOLIAN SAND
Altitude 7680' Slope 3° Exposure 290° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use ACCESSIBLE TO TRESPASS GRAZING
Seral stage MID TO LATE Condition or trend GOOD
plot photographed yes X negative no. 2844-31

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Ambrosia acanthicarpa	+ 1
		Arabis lignifera	+ 1
Shrubs		Chenopodium leptophyllum	+ 1
Chrysothamnus nauseosus	2 1	Corispermum nitidum	+ 1
		Cryptantha fendleri	+ 1
Graminoids		Descurainia richardsonii	+ 1
Artistida purpurea	+ 1	Eriogonum cernuum	+ 1
Oryzopsis hymenoides	2 1	Gilia agreggata	+ 1
Redfieldia flexuosa	+ 1	Helianthus petiolaris	2 1
Sporobolus cryptandrus	+ 1	Lygodesmia juncea	1 1
Stipa comata	2 1	Senecio spartioides	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 20 % Herb layer 40 %
Cryptogamic layer 0 % Litter 15 % Rock (>1cm) 0 % Bare soil 60 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-10 Date 6-25-91 Workers GJ, ACB
Location MOUNTAIN BETWEEN MEDANO AND HORSE CREEKS
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 8800' Slope 18° Exposure 318° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use MOSTLY TOO STEEP FOR CATTLE
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2859-18

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Abies concolor	2 1	Androsace septentrionalis	+ 1
Juniperus scopulorum	1 1	Arabis lignifera	+ 1
Pinus ponderosa	2 1	Artemisia frigida	+ 1
Pseudotsuga menziesii	2 1	Chenopodium fremontii	+ 1
		Chenopodium leptophyllum	+ 1
Shrubs		Erigeron vetensis	+ 1
Cercocarpus montanus	+ 1	Eriogonum jamesii	+ 1
Opuntia polycantha	+ 1	Erysimum asperum	+ 1
Ribes cereum	+ 1	Heterotheca villosa	1 1
Symphoricarpos oreophilus	1 1	Lesquerella montana	+ 1
		Penestemon crandallii	+ 1
Graminoids		Senecio fendleri	+ 1
Carex rossii	1 1	Senecio tridenticulatus	1 1
Festuca ovina	1 1		
Oryzopsis micrantha	1 1		
Poa fendeleriana	1 1		
Sitanion hystrix	+ 1		

COMMUNITY COVER

Tree layer 40 % Shrub layer 10 % Herb layer 20 %
Cryptogamic layer 2 % Litter 40 % Rock (>1cm) 5 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-2 Date 6-20-91 Workers ACB, SCS, GJ, CO
Location FAR WESTERN DUNES. MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7720' Slope 6° Exposure 90° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use BUFFALO/CATTLE TRACKS AND MANURE
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2844-34

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Helianthus petiolaris	+ 1
		Lygodesmia juncea	1 1
Shrubs		Psoralea lanceolata	3 1
-none-			
Graminoids			
Oryzopsis hymenoides	2 1		
Redfieldia flexuosa	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 40 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 60 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-2A Date 6-20-91 Workers ACB, SCS, GJ, CO
Location WEST OF DUNES: CLUMP OF COTTONWOODS ON TOP OF DUNE, 1/4 MILE SOUTH OF PLOT D-2
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7700' Slope 10° Exposure 230° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE SAND-STREAMBANK
Evidence of historic use CATTLE/BUFFALO TRACKS, MANURE
Seral stage EARLY TO MID Condition or trend GOOD
plot photographed yes X negative no. 2844-35

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs
Populus angustifolia	3 1	-none-
Shrubs		
Salix exigua	2 1	
Graminoids		
Redfieldia flexuosa	2 1	

COMMUNITY COVER

Tree layer 50 % Shrub layer 20 % Herb layer 20 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 70 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-2B Date 6-20-91 Workers SCS, CO, CB, GJ
Location W OF DUNES: MARSHY PIT 50 METERS W OF PLOT D-2A, LONE COTTONWOOD CLUMP
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7700' Slope 1° Exposure 80° Topographic Shading (1-3) 2
Vegetation cluster category SAND-MARSH
Evidence of historic use SEVERELY GRAZED AND TRAMPLED BY STRAY BUFFALO/CATTLE LATE IN SUMMER OF 1991
Seral stage MID Condition or trend MODERATE. NOTE ABUNDANCE OF THE ANNUAL ORLU
plot photographed yes X negative no. 2844-36

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Achillea lanulosa	1 1
		Aster chilensis	+ 1
Shrubs		Conyza canadensis	+ 1
Chrysothamnus nauseosus	+ 1	Crepis acuminata	+ 1
Salix exigua	+ 1	Cryptantha fendleri	+ 1
		Descurainia richardsonii	1 1
Graminoids		Epilobium glandulosum	+ 1
Agrostis scabra	+ 1	Erigeron acris	+ 1
Agrostis stolonifera	1 1	Helianthus petiolaris	+ 1
Carex	+ 1	Orthocarpus luteus	2 1
Eleocharis acicularis	2 1	Polygonum douglasii	+ 1
Hordeum jubatum	2 1	Psoralea lanceolata	1 1
Juncus balticus	1 1	Ranunculus cymbalaria	3 1
Muhlenbergia asperifolia	2 1	Taraxacum officinale	+ 1
Oryzopsis hymenoides	+ 1		
Puccinellia nuttalliana	+ 1		
Scirpus nevadensis	+ 1		
Sphenopholis obtusata	+ 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 1 % Herb layer 75 %
Cryptogamic layer 45 % Litter 15 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-3 Date 6-22-91 Workers ACB, SCS, GJ, CO
Location WEST OF DUNES. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7740' Slope 6° Exposure 190° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID TO LATE Condition or trend GOOD
plot photographed yes X negative no. 2834-13

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Chenopodium leptophyllum	+ 1
		Cryptantha jamesii	+ 1
Shrubs		Descurainia fremontii	+ 1
Chrysothamnus nauseosus	2 1	Erigeron vetensis	+ 1
Yucca glauca	1 1	Eriogonum cernuum	+ 1
		Erysimum asperum	+ 1
Graminoids		Helianthus petiolaris	1 1
Bouteloua gracilis	2 1	Lygodesmia juncea	1 1
Oryzopsis hymenoides	2 1	Oenothera coronopifolia	+ 1
Redfieldia flexuosa	1 1	Senecio spartioides	+ 1
Sporobolus cryptandrus	1 1		
Stipa comata	1 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 30 % Herb layer 40 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-4 Date 6-22-91 Workers ACB, SCS, GJ, CO
Location WEST OF DUNES. UNABLE TO FIND MARKER, BUT FOUND 1/4 SEC. TO THE N
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N/26S R12E/73W Parent material AEOLIAN SAND
Altitude 7680' Slope 9° Exposure 120° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID TO LATE Condition or trend GOOD
plot photographed yes X negative no. 2834-9

RECONNAISSANCE DATA
cover/sociability

Trees			Forbs	
-none-			Artemisia dracunculus	+ 1
			Chenopodium leptophyllum	+ 1
Shrubs			Erigeron speciosus	+ 1
Chrysothamnus nauseosus	2	1	Erysimum asperum	+ 1
Yucca glauca	2	1	Gilia longiflora	+ 1
			Helianthus petiolaris	+ 1
Graminoids			Psoralea lanceolata	+ 1
Oryzopsis hymenoides	2	1	Senecio spartioides	+ 1
Redfieldia flexuosa	1	1		
Sporobolus cryptandrus	+	1		
Stipa comata	2	1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 35 % Herb layer 30 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 0 % Bare soil 50 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-7 Date 8-27-91 Workers EDM, JEO
Location RABBITBRUSH PATCH IN NE-INTERIOR DUNES. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8580' Slope 24° Exposure 60° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage EARLY-MID Condition or trend GOOD
plot photographed yes X negative no. 9063-9

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Cirsium undulatum	1 1
		Helianthus petiolaris	1 1
Shrubs		Lygodesmia juncea	+ 1
Chrysothamnus nauseosus	2 3	Psoralea lanceolata	2 1
Graminoids			
Oryzopsis hymenoides	1 1		
Redfieldia flexuosa	1 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 10 % Herb layer 40 %
Cryptogamic layer 0 % Litter 35 % Rock (>1cm) 0 % Bare soil 45 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-8 Date 27 AUGUST 91 Workers JEO, EDM
Location NE DUNES. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8560' Slope 4° Exposure 230° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 9063-7

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 1 1

Forbs
Cirsium undulatum + 1
Helianthus petiolaris + 1
Psoralea lanceolata + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 15 %
Cryptogamic layer 0 % Litter 8 % Rock (>1cm) 0 % Bare soil 85 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D-9 Date 6-25-91 Workers ACB, GLJ

Location NE CORNER OF DUNES, W OF MEDANO-LITTLE MEDANO CONFLUENCE. NO MARKER FOUND

UTM grid coordinates

Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG

Township and Range T26S R73W Parent material AEOLIAN SAND

Altitude 8520' Slope 15° Exposure 40° Topographic Shading (1-3) 2

Vegetation cluster category STABILIZED DUNES

Evidence of historic use

Seral stage EARLY-MID Condition or trend GOOD

plot photographed yes X negative no. 2834-28

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Cirsium undulatum	1 1
		Corispermum nitidum	1 1
Shrubs		Helianthus petiolaris	2 1
Chrysothamnus nauseosus	1 1	Lygodesmia juncea	+ 1
		Penstemon angustifolius	1 1
Graminoids		Psoralea lanceolata	4 5
Oryzopsis hymenoides	2 1	Salsola kali	1 1
Redfieldia flexuosa	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 3 % Herb layer 80 %

Cryptogamic layer 0 % Litter 60 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. D.8-9.5 Date 6-25-91 Workers SCS, CNO, GJ, ACB
Location WINTERFAT PATCH NEAR HORSE CREEK WASH
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material STABILIZED DUNES OR SANDY ALLUVIUM
Altitude 8360' Slope EST. 1° Exposure EST. 200° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use ADJACENT TO INHOLDING
Seral stage MID-LATE Condition or trend MODERATE. (SAKA, HYPERABUNDANT CRFE)
plot photographed yes X negative no. 2834-34

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Artemisia campestris	+ 1
		Artemisia frigida	+ 1
Shrubs		Chenopodium leptophyllum	+ 1
Ceratoides lanata	4 1	Cryptantha fendleri	2 1
		Lygodesmia juncea	+ 1
Graminoids		Salsola kali	+ 1
Agropyron smithii	1 1	Senecio spartioides	+ 1
Oryzopsis hymenoides	1 1		
Sporobolus cryptandrus	+ 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 70 % Herb layer 10 %
Cryptogamic layer 0 % Litter 50 % Rock (>1cm) 0 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-10 Date 6-24-91 Workers ACB, GJ

Location E BOUNDARY S OF HORSE CREEK. PLOT IS 33 METERS WEST OF SURVEY MARKER

UTM grid coordinates

Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG

Township and Range T26S R73W Parent material SAND, ALLUVIAL AND/OR AEOLIAN

Altitude 8480' Slope 8° Exposure 210° Topographic Shading (1-3) 1

Vegetation cluster category STABILIZED DUNES

Evidence of historic use ALL OF CORRIDOR BETWEEN DUNES AND MOUNTAIN WAS PROBABLY STRONGLY GRAZED

Seral stage LATE Condition or trend GOOD

plot photographed yes X negative no. 2859-15

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Astragalus ceramicus	+ 1
		Chenopodium leptophyllum	+ 1
Shrubs		Cryptantha jamesii	+ 1
Chrysothamnus nauseosus	1 1	Cryptantha fendleri	+ 1
Opuntia polycantha	3 1	Descurainia richardsonii	+ 1
Yucca glauca	2 1	Equisetum laevigatum	1 1
		Eriogonum cernuum	+ 1
Graminoids		Erysimum asperum	+ 1
Oryzopsis hymenoides	2 1	Helianthus petiolaris	+ 1
Redfieldia flexuosa	1 1	Lithospermum incisum	+ 1
Sporobolus cryptandrus	+ 1	Senecio spartioides	1 1
Stipa comata	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 35 % Herb layer 60 %

Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-1.5 Date 6-20-91 Workers ACB, GJ, SCS
Location W OF DUNES, GATE FROM ZAPATA RANCH. 40 METERS NE FROM SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7680' Slope 3° Exposure 20° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use ABUNDANT PREVIOUS YEAR'S BUFFALO/CATTLE MANURE
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-30

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
Chrysothamnus nauseosus 3 1

Graminoids
Agropyron smithii 2 1
Oryzopsis hymenoides 2 1
Redfieldia flexuosa 4 1

Forbs
Chenopodium leptophyllum + 1
Helianthus petiolaris + 1
Lygodesmia juncea + 1
Oenothera coronopifolia + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 30 % Herb layer 65 %
Cryptogamic layer 0 % Litter 40 % Rock (>1cm) 0 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-1.5A Date 8-27-91 Workers SCS, JEO, EDM, ACB
Location WEST OF DUNES. SMALL MARSHY AREA NEAR ZAPATA RANCH GATE
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7680' Slope 1° Exposure 20° Topographic Shading (1-3) 1
Vegetation cluster category SAND-MARSH
Evidence of historic use
Seral stage MID TO LATE Condition or trend GOOD
plot photographed yes X negative no. 9063-6

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Aster chilensis	+ 1
		Chenopodium leptophyllum	+ 1
Shrubs		Descurainia pinnata	+ 1
Chrysothamnus nauseosus	+ 1	Helianthus petiolaris	+ 1
		Lactuca tatarica	1 1
Graminoids		Lygodesmia juncea	+ 1
Agropyron smithii	+ 1	Oenothera coronipifolia	+ 1
Juncus balticus	5 4	Senecio spartioides	+ 1
Muhlenbergia asperifolia	2 3	Taraxacum officinale	+ 1
Oryzopsis hymenoides	+ 1		
Redfieldia flexuosa	+ 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer + % Herb layer 80 %
Cryptogamic layer 0 % Litter 90 % Rock (>1cm) 0 % Bare soil + %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-2 Date 6-20-91 Workers SCS, CNO, GJ, ACB
Location FENCED WETLAND AREA W OF DUNES: E-MOST MARSHY PATCH. PLOT IS N OF ROADWAY. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7680' Slope 1° Exposure 190° Topographic Shading (1-3) 1
Vegetation cluster category SAND-MARSH
Evidence of historic use
Seral stage MID-LATE Condition or trend GOOD
plot photographed yes X negative no. 2844-28

RECONNAISSANCE DATA
cover/sociability

Trees			Forbs		
-none-			Cleome serrulata		+ 1
			Cryptantha fendleri		+ 1
Shrubs			Descurainia richardsonii		+ 1
Chrysothamnus nauseosus ssp. bigelovii	1	1	Lactuca tatarica	2	1
Chrysothamnus nauseosus ssp. hololeucus	1	1	Oenothera coronopifolia		+ 1
			Psoralea lanceolata		+ 1
Graminoids			Salsola kali		+ 1
Agropyron smithii		+ 1	Senecio spartioides		+ 1
Carex		1 1			
Distichlis spicata		1 1			
Juncus balticus		4 4			
Muhlenbergia asperifolia		+ 1			

COMMUNITY COVER

Tree layer 0 % Shrub layer 6 % Herb layer 75 %
Cryptogamic layer 0 % Litter 75 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-2A Date 6-20-91 Workers SCS, CO, CB, GJ
Location FENCED WETLAND AREA W OF DUNES: 2ND MARSHY AREA FROM E. PLOT IS ON E BANK OF POND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7680' Slope 4° Exposure 270° Topographic Shading (1-3) 1
Vegetation cluster category MARSH
Evidence of historic use FENCE OFFERS PROTECTION. MUST HAVE BEEN HEAVILY MISUSED BEFORE PARK
Seral stage MID TO LATE Condition or trend MODERATE- WEEDY SPECIES PERSIST
plot photographed yes X negative no. 2844-29

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Aster brachyactis	+ 1
		Aster paucifiorus	+ 1
Shrubs		Bidens cernua	+ 1
Chrysothamnus nauseosus	+ 1	Cleome multicaulis	1 1
		Crepis acuminata	3 1
Graminoids		Epilobium glandulosum	2 1
Agropyron smithii	+ 1	Erigeron lonchophyllus	+ 1
Agrostis scabra	+ 1	Lactuca tatarica	1 1
Alopecurus aegualis	+ 1	Lemna minor	1 1
Carex douglasii	3 1	Polygonum amphibium	1 1
Hordeum jubatum	+ 1	Potentilla anserina	4 1
Juncus balticus	4 1	Ranunculus cymbalaria	2 1
Muhlenbergia asperifolia	3 1	Ranunculus sceleratus var. multifidus	+ 1
Puccinellia nuttalliana	+ 1	Sonchus arvensis	+ 1
Scirpus americanus	2 1	Suaeda calceoliformis	+ 1
Scirpus nevadensis	+ 1	Taraxacum officinale	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 1 % Herb layer 97 %
Cryptogamic layer 0 % Litter 80 % Rock (>1cm) 0 % Bare soil 2 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-2B Date 8-27-91 Workers SCS, JEO, EDM, ACB
Location FENCED WETLAND AREA W OF DUNES: 3RD MARSHY SPOT FROM E
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7680' Slope 1° Exposure 70° Topographic Shading (1-3) 1
Vegetation cluster category MARSH
Evidence of historic use
Seral stage MID TO LATE Condition or trend GOOD TO MODERATE
plot photographed yes X negative no. 9063-5

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Aster pauciflora	2 2
		Chenopodium glaucum	+ 1
Shrubs		Chenopodium leptophyllum	+ 1
Chrysothamnus nauseosus spp. hololucus	+ 1	Cleome multicaulus	2 2
		Crepis acuminata	1 2
Graminoids		Potentilla anserina	3 4
Agropyron smithii	2 4	Ranunculus cymbalaria	+ 1
Carex	+ 1	Suaeda calceoliformis	+ 1
Distichilis spicata	+ 1		
Hordeum jubatum	2 4		
Juncus balticus	3 4		
Muhlenbergia asperifolia	3 4		
Scirpus nevadensis	+ 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer + % Herb layer 99 %
Cryptogamic layer 0 % Litter 80 % Rock (>1cm) 0 % Bare soil 1 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-3 Date 6-22-91 Workers SCS, ACB
Location W OF DUNES. PLOT IS 60 M NE OF FENCE CORNER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7720' Slope 3° Exposure 70° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2834-15

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 3 1

Forbs
Ambrosia acanthicarpa + 1
Corispermum nitidum + 1
Lygodesmia juncea + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 26 %
Cryptogamic layer 0 % Litter 5 % Rock (>1cm) 0 % Bare soil 75 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-4 Date 6-22-91 Workers SCS, CNO, GJ, ACB
Location W OF DUNES. SURVEY MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N/26S R12E/73W Parent material AEOLIAN SAND
Altitude 7800' Slope 10° Exposure 92° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID TO LATE Condition or trend GOOD
plot photographed yes X negative no. 2834-8

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Corispermum nitidum	+ 1
		Descurainia richardsonii	+ 1
Shrubs		Erysimum asperum	+ 1
Chrysothamnus nauseosus	2 1	Helianthus petiolaris	+ 1
Yucca glauca	+ 1	Machaeranthera canescens	+ 1
		Oenothera coronopifolia	+ 1
Graminoids		Psoralea lanceolata	+ 1
Muhlenbergia pungens	1 1	Senecio spartioides	+ 1
Oryzopsis hymenoides	2 1		
Redfieldia flexuosa	2 1		
Sporobolus cryptandrus	1 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 15 % Herb layer 25 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 70 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-7 Date 8-27-91 Workers EDM, JEO
Location CENTRAL INTERIOR DUNES. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8360' Slope 7° Exposure 220° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 9063-12

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa + 2

Forbs
Psoralea lanceolata 2 1
Helianthus petiolaris 2 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 35 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 0 % Bare soil 70 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-8 Date 8-27-91 Workers EDM, JED
Location E INTERIOR DUNES. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8480' Slope 33° Exposure 50° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 9063-14

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 3 4

Forbs
Psoralea lanceolata + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 35 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 0 % Bare soil 65 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-9 Date 6-24-91 Workers SCS, CNO
Location E DUNES ACROSS FROM HORSE CREEK. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8600' Slope 15° Exposure 0° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2834-22

RECONNAISSANCE DATA
cover/sociability

Trees		
-none-		
Shrubs		
-none-		
Graminoids		
Redfieldia flexuosa	2	1
Forbs		
Corispermum nitidum	1	1
Helianthus petiolaris	+	1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 35 %
Cryptogamic layer 0 % Litter 1 % Rock (>1cm) 0 % Bare soil 70 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-9.4 Date 6-24-91 Workers SCS, CNO
Location COTTONWOOD PATCH, E EDGE OF DUNES ACROSS FROM HORSE CANYON
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73E Parent material AEOLIAN SAND
Altitude 8400' Slope 27° Exposure 110° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage EARLY-MID Condition or trend GOOD
plot photographed yes X negative no. 2834-26

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Populus angustifolia	2 3	Ambrosia acanthicarpa	+ 1
		Comandra umbellata	2 1
Shrubs		Corispermum nitidum	+ 1
-none-		Equisetum laevigatum	1 1
		Helianthus petiolaris	+ 1
Graminoids		Lygodesmia juncea	+ 1
Oryzopsis hymenoides	+ 1	Oenothera coronopifolia	+ 1
Redfieldia flexuosa	2 1	Penstemon angustifolius	+ 1
		Psoralea lanceolata	+ 1
		Senecio spartioides	1 1

COMMUNITY COVER

Tree layer 15 % Shrub layer 0 % Herb layer 20 %
Cryptogamic layer 0 % Litter 8 % Rock (>1cm) 0 % Bare soil 60 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-9.4A Date 6-24-91 Workers SCS, CO, CB,
Location E BANK OF MEDANO CREEK JUST N OF INHOLDING NEAR HORSE CANYON WASH
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material SAND AND ALLUVIUM
Altitude 8320' Slope 4° Exposure 270° Topographic Shading (1-3) 2
Vegetation cluster category MARSH-STREAMBANK
Evidence of historic use DOUBTLESS STRONGLY GRAZED IN PAST
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2834-27

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Juniperus scopulorum	+ 1	Achillea lanulosa	+ 1
		Artemisia frigida	1 1
Shrubs		Asclepias speciosa	+ 1
Alnus tenuifolia	2 1	Chenopodium leptophyllus	+ 1
Ribes leptanthum	+ 1	Descurainia richardsonii	+ 1
Rosa woodsii	+ 1	Epilobium glandulosum	+ 1
Salix bebbiana	4 1	Equisetum arvense	+ 1
		Erigeron lonchophyllus	+ 1
Graminoids		Euphorbia robusta	+ 1
Agropyron smithii	1 1	Galium boreale	+ 2
Agropyron trachycaulum	2 1	Ligusticum porteri	+ 1
Agrostis scabra	+ 1	Mentha arvensis	+ 1
Agrostis stolonifera	+ 1	Mimulus floribundus	+ 1
Bromus anomalus	1 1	Oxypolis fendleri	+ 1
Juncus balticus	2 1	Potentilla norvegica	+ 1
Juncus bufonius	+ 1	Psoralea lanceolata	+ 1
Muhlenbergia andina	+ 1	Senecio fendleri	+ 1
Poa pratensis	2 1	Senecio spartioides	+ 1
		Senecio tridenticulatus	1 1
		Smilacina stellata	+ 1
		Stellaria longifolia	+ 1
		Taraxacum officinale	+ 1
		unk (saxifrage?)	+ 1

COMMUNITY COVER

Tree layer + % Shrub layer 80 % Herb layer 40 %
Cryptogamic layer 3 % Litter 70 % Rock (>1cm) 0 % Bare soil 10 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-9.7 Date 6-24-91 Workers ACB, GJ
Location NEAR HORSE CANYON WASH
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material ALLUVIAL OR AEOLIAN SAND
Altitude 8360' Slope 6° Exposure 208° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2859-17

RECONNAISSANCE DATA
cover/sociability

Trees			**Forbs**		
-none-			Artemisia campestris	1	1
			Chenopodium leptophyllum	+	1
Shrubs			Cirsium canescens	+	1
Tetradymia canescens	+	1	Cryptantha jamesii	+	1
			Descurainia richardsonii	+	1
Graminoids			Equisetum laevigatum	2	1
Oryzopsis hymenoides	3	1	Erysimum asperum	+	1
Redfieldia flexuosa	1	1	Helianthus petiolaris	+	1
Sporobolus cryptandrus	+	1	Lithospermum incisum	+	1
Stipa comata	2	1	Penstemon angustifolius	+	1
			Psoralea lanceolata	+	1
			Senecio spartioides	+	1

COMMUNITY COVER

Tree layer 0 % Shrub layer + % Herb layer 65 %
Cryptogamic layer 0 % Litter 35 % Rock (>1cm) 0 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E-9.8 Date 6-24-91 Workers ACB, GJ
Location NEAR HORSE CANYON WASH
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material ALLUVIAL OR AEOLIAN SAND
Altitude 8440' Slope 14° Exposure 280° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2859-16

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Populus tremuloides	3 1	Artemisia campestris	+ 1
		Cryptantha jamesii	+ 1
Shrubs		Equisetum laevigatum	+ 1
Chrysothamnus nauseosus	2 1	Erysimum asperum	+ 1
Chrysothamnus viscidiflorus	+ 1	Heterotheca villosa	+ 1
Opuntia polycantha	1 1	Lithospermum incisum	+ 1
Yucca glauca	1 1	Penstemon	+ 1
		Penstemon angustifolius	+ 1
Graminoids		Psoralea lanceolata	+ 1
Oryzopsis hymenoides	2 1	Senecio tridenticulatus	+ 1
Redfieldia flexuosa	1 1		
Sporobolus cryptandrus	+ 1		
Stipa comata	2 1		

COMMUNITY COVER

Tree layer 50 % Shrub layer 25 % Herb layer 30 %
Cryptogamic layer 0 % Litter 25 % Rock (>1cm) 0 % Bare soil 35 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. E.2-9.3 Date 6-24-91 Workers SCS, CO
Location E EDGE OF DUNES ABOVE INHOLDERS CABIN, ACROSS FROM HORSE CANYON
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8400' Slope 30° Exposure 110° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD. SLOPE UNSTABLE, BUT VEGETATION IS OK
plot photographed yes X negative no. 2834-25

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Ambrosia acanthicarpa	+ 1
		Cirsium undulatum	1 1
Shrubs		Corispermum nitidum	+ 1
Chrysothamnus nauseosus	3 1	Lygodesmia juncea	+ 1
		Oenothera coronopifolia	+ 1
Graminoids		Penstemon angustifolius	1 1
Oryzopsis hymenoides	+ 1	Psoralea lanecolata	2 1
Redfieldia flexuosa	1 1	Salsola kali	+ 1
		Senecio spartioides	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 33 % Herb layer 20 %
Cryptogamic layer 0 % Litter 2 % Rock (>1cm) 0 % Bare soil 60 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. F-10 Date 6-21-91 Workers ACB, GJ,
Location E BOUNDARY S OF CASTLE CREEK. PLOT IS 7 METERS W OF SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73S Parent material AEOLIAN OR ALLUVIAL SAND
Altitude 8440' Slope 23° Exposure 252° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2859-11

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	1 1
		Cryptantha jamesii	+ 1
Shrubs		Descurainia richardsonii	+ 1
Chrysothamnus nauseosus	1 1	Eriogonum cernuum	+ 1
		Lygodesmia juncea	+ 1
Graminoids		Penstemon angustifolius	+ 1
Hordeum jubatum	+ 1	Psoralea lanceolata	3 1
Oryzopsis hymenoides	2 1	Salsoa kali	+ 1
Redfieldia flexuosa	+ 1	Senecio spartioides	+ 1
Stipa comata	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 5 % Herb layer 65 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 30 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. F-3 Date 6-19-91 Workers ACB, GJ, SCS, CO
Location WEST BOUNDARY. PLOT IS 20 METERS FROM FENCE. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N R12E Parent material AEOLIAN SAND
Altitude 7700' Slope 3° Exposure 80° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2844-26

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Ambrosia acanthicarpa	+ 1
		Corispermum nitidum	+ 1
Shrubs		Helianthus petiolaris	+ 1
-none-		Lygodesmia juncea	2 1
		Oenothera coronopifolia	+ 1
Graminoids		Orobanche multiflora	+ 1
Oryzopsis hymenoides	2 1	Psoralea lanceolata	2 1
Redfieldia flexuosa	3 1	Senecio spartioides	1 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 55 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. F-4 Date 6-19-91 Workers ACB, GJ, SCS, CO
Location W OF DUNES. MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T41N/26S R12E/73W Parent material AEOLIAN SAND
Altitude 7760' Slope 2° Exposure 30° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-27

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
Chrysothamnus nauseosus 2 1

Graminoids
Aristida purpurea 1 1
Oryzopsis hymenoides 2 1
Sporobolus cryptandrus 3 1
Stipa comata 1 1

Forbs
Descurainia richardsonii + 1
Helianthus petiolaris + 1
Oenothera coronopifolia + 1
Psoralea lanecolata 2 1
Senecio spartioides + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 24 % Herb layer 65 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. F-9 Date 6-21-91 Workers SCS, CNO
Location EASTERN DUNES. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S 573W Parent material AEOLIAN SAND
Altitude 8360' Slope 25° Exposure 210° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2834-5

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
-none-

Forbs
Psoralea lanceolata 1 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 3 %
Cryptogamic layer 0 % Litter 1 1/2 % Rock (>1cm) 0 % Bare soil 95 1/2 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. F.2-9.4 Date 6-21-91 Workers SCS, CO
Location W BANK OF MEDANO ABOVE SAWMILL CONFLUENCE
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8240' Slope 10° Exposure 140° Topographic Shading (1-3) 2
Vegetation cluster category STREAMBANK
Evidence of historic use WILLOW PATCH OFTEN USED FOR RESTROOM
Seral stage MID-EARLY Condition or trend GOOD. ACTIVE ENCROACHMENT BY DUNES
plot photographed yes X negative no. 2834-6

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Ambrosia acanthicarpa	+ 1
		Chenopodium fremontii	+ 1
Shrubs		Chenopodium leptophyllum	+ 1
Ribes leptanthum	+ 1	Cirsium undulatum	+ 1
Salix exigua	4 5	Hackelia floribunda	2 1
		Heracleum lantum	1 1
Graminoids		Mentha arvensis	+ 1
Agropyron trachycaulum	2 1	Senecio spartioides	+ 1
Poa pratensis	1 3		
unk	+ 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 40 % Herb layer 30 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. F.2-9.5 Date 6-21-91 Workers SCS, CO, CB, GJ
Location E BANK OF MEDANO ABOVE SAWMILL CONFLUENCE, AT TURNOFF
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND AND ALLUVIUM
Altitude 8200' Slope 2° Exposure 230° Topographic Shading (1-3) 2
Vegetation cluster category STREAMBANK-MOUNTAINSIDE
Evidence of historic use NEXT TO ROADWAY
Seral stage LATER Condition or trend GOOD-MODERATE
plot photographed yes X negative no. 2834-7

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Juniperus scopulorum	2 1	Achillea lanulosa	2 1
Populus angustifolia	4 1	Allium cernuum	+ 1
		Artemisia carruthii	1 1
Shrubs		Artemisia frigida	+ 1
Ribes cereum	+ 1	Chenopodium fremontii	2 1
Ribes leptanthum	1 1	Chenopodium leptophyllum	+ 1
		Corydalis aurea	+ 1
Graminoids		Descurainia richardsonii	+ 1
Agropyron repens	2 1	Hackelia floribunda	+ 1
Agropyron smithii	1 1	Heterotheca villosa	+ 1
Bromus ciliatus	2 1	Machaerantha canescens	+ 1
Bromus tectorum	+ 1	Salsola kali	+ 1
Festuca ovina	+ 1	Senecio fendleri	+ 1
Oryzopsis micrantha	1 1	Senecio spartioides	+ 1
Poa fendelariana	2 1	Senecio tridenticulatus	+ 1
Redfieldia flexuosa	+ 1	Urtica dioica	1 3

COMMUNITY COVER

Tree layer 65 % Shrub layer 5 % Herb layer 80 %
Cryptogamic layer 0 % Litter 70 % Rock (>1cm) 0 % Bare soil 10 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. F.2-9.8 Date 6-21-91 Workers ACB, GJ
Location PONDEROSA PINES NEAR ROAD BETWEEN SAWMILL CANYON & CASTLE CREEK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material SAND AND ALLUVIUM
Altitude 8320' Slope 17° Exposure 248° Topographic Shading (1-3) 1
Vegetation cluster category MOUNTAINSIDE-STREAMBANK
Evidence of historic use
Seral stage LATER Condition or trend GOOD-MODERATE. UNDERGROWTH SURPRESSED BY TREES
plot photographed yes X negative no. 2859-12

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs
Pinus edulis	1 1	-none-
Pinus ponderosa	5 1	
Shrubs		
Ribes leptanthum	1 1	
Graminoids		
-none-		

COMMUNITY COVER

Tree layer 75 % Shrub layer 3 % Herb layer 0 %
Cryptogamic layer 1 % Litter 99 % Rock (>1cm) 1 % Bare soil 1 %

Cover classes		Sociability classes	
< 1%	+	Growing as single, widely spaced individuals	- 1
1 - 5%	1	Small groups	- 2
6 - 25%	2	In small patches	- 3
26 - 50%	3	Extensive patches	- 4
51 - 75%	4	In nearly pure stands	- 5
76 - 95%	5		
>95%	6		

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. G-10 Date 6-18-91 Workers SCS, CO
Location E BOUNDARY S OF BUCK CREEK. 10M W OF N OF TWO SURVEY MARKERS
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 8600' Slope EST. 30° Exposure EST. 230° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use TOO STEEP FOR USE EXCEPT BY SHEEP. CURRENT TRAFFIC OF WILDLIFE AROUND FENCE END
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2844-12

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	1 1	Arabis hoelboellii var. retrofracta	1 1
Pinus edulis	2 1	Artemisia frigida	1 1
		Chenopodium leptophyllum	+ 1
Shrubs		Descurainia pinnata	+ 1
Cercocarpus montanus	1 1	Eriogonum jamesii	+ 1
Holodiscus dumosus	2 1	Erysimum asperum	+ 1
Opuntia polycantha	2 1	Eupatorium herbaceum	+ 1
		Gayophytum diffusum	+ 1
Graminoids		Heterotheca villosa	2 1
Bouteloua gracilis	1 1	Lappula redowskii	+ 1
Carex rossii	1 1	Lesquerella montana	+ 1
Muhlenbergia montana	2 1	Lygodesmia juncea	+ 1
Sitanion hystrix	+ 1	Mirabilis oxybaphoides	+ 1
Stipa pinetorum	2 1	Phacelia alba	+ 1

COMMUNITY COVER

Tree layer 25 % Shrub layer 15 % Herb layer 50 %
Cryptogamic layer 5 % Litter 20 % Rock (>1cm) 15 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. 6-3 Date 6-19-91 Workers ACB, GJ, SCS, CO
Location W BOUNDARY. PLOT IS 20 M SE OF CORNER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40/41N R12E Parent material AEOLIAN SAND
Altitude 7720' Slope 5° Exposure 110° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2844-23

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Ambrosia acanthicarpa	+ 1
		Corispermum nitidum	+ 1
Shrubs		Lygodesmia juncea	1 1
-none-		Orobanche multiflora	+ 1
		Psoralea lanceolata	+ 1
Graminoids			
Oryzopsis hymenoides	+ 1		
Redfieldia flexuosa	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 28 %
Cryptogamic layer 0 % Litter 15 % Rock (>1cm) 0 % Bare soil 57 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. 6-4 Date 6-19-91 Workers ACB, GJ, SCS, CO
Location W OF DUNES. SURVEY MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40/41N R12/13E Parent material AEOLIAN SAND
Altitude 7740' Slope 2° Exposure 50° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-24

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Helianthus petiolaris	+ 1
		Lygodesmia juncea	+ 1
Shrubs		Senecio spartioides	+ 1
Chrysothamnus nauseosus	3 1		
Yucca glauca	+ 1		
Graminoids			
Oryzopsis hymenoides	3 1		
Redfieldia flexuosa	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 26 % Herb layer 35 %
Cryptogamic layer 0 % Litter 15 % Rock (>1cm) 0 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. 6-4A Date 6-19-91 Workers ACB, GJ, SCS, CO
Location W OF DUNES. PLOT IS 65 METERS W OF G-4
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40/41N R12E Parent material AEOLIAN SAND
Altitude 7740' Slope 12° Exposure 345° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID-LATE Condition or trend GOOD
plot photographed yes X negative no. 2844-25

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
Ceratoides lanata 3 1
Chrysothamnus nauseosus 3 1

Graminoids
Muhlenbergia pungens + 1
Oryzopsis hymenoides 2 1
Sporobolus cryptandrus 2 1

Forbs
Chenopodium leptophyllum + 1
Corispermum nitidum + 1
Cryptantha fendleri + 1
Descurainia richardsonii + 1
Eriogonum cernuum 1 1
Helianthus petiolaris + 1
Lygodesmia juncea + 1
Senecio fendleri + 1
Senecio spartioides + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 65 % Herb layer 40 %
Cryptogamic layer 0 % Litter 35 % Rock (>1cm) 0 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. G-8.8 Date 6-18-91 Workers ACB, GJ
Location E EDGE OF DUNES ACROSS FROM BUCK CREEK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8240' Slope 10° Exposure 144° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2859-7

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 3 1

Forbs
Helianthus petiolaris + 1
Psoralea lanceolata + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 30 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 60 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. 6-8.9 Date 6-18-91 Workers ACB, GJ
Location E EDGE OF DUNES
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8240' Slope 5° Exposure 214° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2859-8,9

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
-none-

Forbs

Helianthus petiolaris	+ 1
Oenothera coronopifolia	+ 1
Psoralea lanceolata	3 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 40 %
Cryptogamic layer 0 % Litter 5 % Rock (>1cm) 20 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. 6-9 Date 6-18-91 Workers ACB, GJ
Location E EDGE OF DUNES ACROSS FROM BUCK CREEK. NO MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8200' Slope 1° Exposure 176° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2859-6

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa + 1

Forbs
Psoralea lanceolata 2 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 6 %
Cryptogamic layer 0 % Litter + % Rock (>1cm) 5 % Bare soil 90 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. G-9.5 Date 6-18-91 Workers ACB, GJ
Location NEAR BUCK CREEK WASH, ON 1/4 SECTION
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked SURVEY MARKER
Township and Range T26S R73W Parent material AEOLIAN SAND, POSSIBLY SOME ALLUVIUM
Altitude 8240' Slope 11° Exposure 265° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2859-5

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Pinus edulis	+ 1	Chenopodium leptophyllum	+ 1
		Cryptantha jamesii	+ 1
Shrubs		Descurainia richardsonii	+ 1
Chrysothamnus nauseosus	3 1	Euphorbia robusta	+ 1
Opuntia polycantha	+ 1	Helianthus petiolaris	+ 1
Rhus trilobata	2 1	Lithospermum incisum	+ 1
Yucca glauca	+ 1	Psoralea lanceolata	2 1
		Tripterocalyx micranthus	+ 1
Graminoids			
Oryzopsis hymenoides	2 1		
Redfieldia flexuosa	2 1		
Sporobolus cryptandrus	+ 1		
Stipa comata	1 1		

COMMUNITY COVER

Tree layer 1 % Shrub layer 40 % Herb layer 30 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. G-9.7 Date 6-18-91 Workers SCS, CO
Location BUCK CREEK. PLOT BEGINS 65M BELOW TRAIL CROSSING
UTM grid coordinates
Plot size 1/40 ACRE Plot shape 4 X 25M How marked STEEL PEG--CENTER OF UPPER END
Township and Range T26S R73W Parent material SAND AND ALLUVIUM
Altitude 8320' Slope 5° Exposure 265° Topographic Shading (1-3) 2
Vegetation cluster category WETLAND-MOUNTAINSIDE
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2844-13

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	1 1	Achillea lanulosa	1 1
Pinus edulis	1 1	Antennaria rosea	2 4
Populus angustifolia	3 1	Aster chilensis	+ 1
Pseudotsuga menziesii	1 1	Castilleja linearifolia	+ 1
		Cirsium undulatum	+ 1
Shrubs		Crepis runcinata	2 1
Juniperus communis	+ 1	Erigeron lonchophyllus	+ 1
Rhus trilobata	+ 1	Gentiana affinis	+ 1
Salix exigua	1 1	Gilia aggregata	+ 1
		Habenaria hyperborea	1 1
Graminoids		Heterotheca villosa	+ 1
Bromus ciliatus	3 5	Lactuca tatarica	+ 1
Festica ovina	+ 1	Ligusticum porteri	+ 1
Juncus balticus	3 5	Lupinis pusillus	+ 1
Juncus ensifolius	+ 1	Mentha arvensis	+ 1
Poa pratensis	1 1	Oxytropis sericea	1 3
		Psoralea lanceolata	+ 1
		Senecio pudicus	+ 1
		Senecio tridenticulatus	+ 1
		Taraxacum officinale	2 1
		Thermopsis montana	1 1
		Trifolium repens	1 1

COMMUNITY COVER

Tree layer 40 % Shrub layer 5 % Herb layer 90 %
Cryptogamic layer 30 % Litter 80 % Rock (>1cm) 0 % Bare soil 5 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. G.9-9.8 Date 6-21-91 Workers SCS, CO
Location MOUTH OF 1ST SMALL CANYON N OF MOSCA CREEK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26S R73W Parent material ALLUVIUM
Altitude 8440' Slope 22° Exposure 330° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use OLD IRRIGATION DITCH BELOW (NOW USED AS TRAIL)
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2834-3

RECONNAISSANCE DATA
cover/sociability

Trees			**Forbs**		
Abies concolor	3	1	Arabis hirsuta	+	1
Juniperus scopulorum	1	1	Artemisia campestris	1	1
Pseudotsuga menziesii	1	1	Chenopodium fremontii	+	1
			Chenopodium leptophyllum	+	1
Shrubs			Descurainia richardsonii	+	1
Amelanchier alnifolia	2	1	Erigeron acris	+	1
Holodiscus dumosus	2	1	Erigeron flagellaris	+	1
Jamesia americana	2	1	Erigeron speciosus	+	1
Opuntia polycantha	+	1	Erysimum asperum	1	1
Prunus virginiana	2	1	Heterotheca villosa	+	1
Rhus trilobata	1	1	Machaerantha canescens	+	1
Ribes cereum	1	1	Penstemon barbatus	+	1
Ribes leptanthum	1	1	Senecio tridenticulatus	+	1
Symphoricarpos oreophilus	1	1	Solidago sparsiflora	1	1
Graminoids					
Carex rossii	+	1			
Festuca ovina	+	1			
Muhlenbergia montana	+	1			
Oryzopsis micrantha	1	1			
Poa fendleriana	+	1			
Sitanion hystrix	+	1			

COMMUNITY COVER

Tree layer 40 % Shrub layer 35 % Herb layer 20 %
Cryptogamic layer 13 % Litter 50 % Rock (>1cm) 20 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H-10 Date 6-21-91 Workers SCS, CNO
Location E BOUNDARY, MOUNTAINSIDE SE OF AMPHITHEATER. SURVEY MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26/27S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 9000' Slope 16° Exposure 310° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use TOO STEEP FOR USE EXCEPT BY SHEEP
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2834-1

RECONNAISSANCE DATA
cover/sociability

Trees			Antennaria rosea	1	1
Abies concolor	2	1	Arabis lignifera	+	1
Juniperus scopulorum	1	1	Artemisia campestris	+	1
Pinus edulis	2	1	Artemisia carruthii	+	1
			Artemisia frigida	2	1
Shrubs			Castilleja linariifolia	+	1
Cercocarpus montanus	2	1	Chenopodium fremontii	+	1
Chrysothamnus viscidiflorus	+	1	Descurainia richardsonii	+	1
Opuntia polycantha	2	1	Erigeron speciosus	+	1
Ribes cereum	+	1	Erigeron vetensis	1	1
Symphoricarpos oreophilus	1	1	Eriogonum jamesii	1	1
Yucca glauca	+	1	Erysimum asperum	+	1
			Gayophytum diffusum	+	1
Graminoids			Gilia pinnatifida	+	1
Bouteloua gracilis	2	2	Heterotheca villosa	2	1
Carex rossii	+	1	Heuchera parvifolia	+	1
Festuca ovina	2	1	Lesquerella montana	1	1
Koeleria nitida	+	1	Lychnis drummondii	+	1
Muhlenbergia montana	1	1	Penestemon barbatus	+	1
Poa fendeleriana	1	1	Polygonum douglasii	+	1
Sitianion hystrix	+	1	Potentilla pennsylvanica	+	1
			Selaginella densa	1	1
Forbs			Senecio tridenticulatus	1	1
Allium cernum	1	1	Woodsii oregona	+	1
Androsace septentrionalis	1	1	unk (crucifer)	+	1

COMMUNITY COVER

Tree layer 30 % Shrub layer 15 % Herb layer 55 %
Cryptogamic layer 40 % Litter 40 % Rock (>1cm) 40 % Bare soil 5 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H-3 Date 6-19-91 Workers SCS, ACB, GJ, CO
Location W BOUNDARY. PLOT CENTER IS 7M OUT FROM CORNER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL FENCE POST
Township and Range T40N R12E Parent material AEOLIAN SAND
Altitude 7680' Slope 2° Exposure 325° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2844-20

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Ambrosia acanthicarpa	+ 1
		Corispermum nitidum	+ 1
Shrubs		Cycloloma atriplicifolia	+ 1
-none-		Lygodesmia juncea	+ 1
		Psoralea lanceolata	1 1
Graminoids		Salsola kali	+ 1
Redfieldia flexuosa	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 50 %
Cryptogamic layer 0 % Litter 5 % Rock (>1cm) 0 % Bare soil 45 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H-4 Date 6-19-91 Workers SCS, ACB, GJ, CO
Location SW OF DUNES. SURVEY MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40W R12/13E Parent material AEOLIAN SAND
Altitude 7720' Slope 10° Exposure 250° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2844-21

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 3 1

Forbs
Corispermum nitidus + 1
Helianthus petiolaris + 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 45 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 0 % Bare soil 45 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H-5 Date 6-15-91 Workers ACB, GJ, SCS, CO
Location SW CORNER OF DUNES. MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40W/T26/27S R13E/73W Parent material AEOLIAN SAND
Altitude 7800' Slope 2° Exposure 25° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-6

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Corispermum nitidum	+ 1
		Cryptantha fendleri	+ 1
Shrubs		Helianthus petiolaris	+ 1
Chrysothamnus nauseosus	1 1	Lygodesmia juncea	2 1
		Oenothera coronopifolia	+ 1
Graminoids		Orobanche multiflora	+ 1
Oryzopsis hymenoides	3 1	Psoralea lanceolata	2 1
Redfieldia flexuosa	1 1	Senecio spartioides	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 3 % Herb layer 45 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 45 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H-9 Date 6-15-91 Workers CB, GJ
Location SE SIDE OF DUNES PICNIC AREA. SURVEY MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked SURVEY MARKER
Township and Range T26/27S R73W Parent material AEOLIAN SAND
Altitude 8080' Slope 13° Exposure 6° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use OLD FENCELINE NEXT HILL S
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2859-0,1

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Cryptantha jamesii	+ 1
		Descurainia richardsonii	+ 1
Shrubs		Helianthus petiolarus	+ 1
Chrysothamnus nauseosus	1 1	Lupinus pusillus	+ 1
Chrysothamnus parryi	+ 1	Lygodesmia juncea	+ 1
Opuntia polycantha	2 1	Penstemon angustifolius	+ 1
Rhus trilobata	1 1	Psoralea lanceolata	1 1
Yucca glauca	1 1	Senecio spartioides	+ 1
Graminoids			
Bouteloua gracilis	2 1		
Oryzopsis hymenoides	2 1		
Redfieldia flexuosa	1 1		
Sporobolus cryptandrus	1 1		
Stipa comata	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 15 % Herb layer 50 %
Cryptogamic layer 0 % Litter 11 % Rock (>1cm) 3 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H-9.5 Date 6-15-91 Workers SCS, CNO
Location EAST BOUNDARY N OF MOSCA CREEK. PLOT IS 10M NW OF SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T26/27S R73W Parent material SAND, ALLUVIUM
Altitude 8240' Slope 10° Exposure 306° Topographic Shading (1-3) 2
Vegetation cluster category SAND-MOUNTAINSIDE
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2844-7

RECONNAISSANCE DATA
cover/sociability

Trees			**Forbs**		
-none-			Artemisia frigida	1	1
			Astragalus ceramicus	+	1
Shrubs			Chenopodium leptophyllum	+	1
Chrysothamnus nauseosus	1	1	Cryptantha jamesii	+	1
Chrysothamnus parryi	1	1	Eriogonum jamesii	+	1
Chrysothamnus viscidiflorus	+	1	Erysimum asperum	+	1
Opuntia polycantha	2	1	Euphorbia robusta	+	1
Symphoricarpos oreophilus	+	1	Gilia aggregata	+	1
Tetradymia canescens	1	1	Gilia longiflora	+	1
Yucca glauca	1	1	Heterotheca villosa	1	1
			Hymenopappus filifolia	+	1
Graminoids			Lithospermum incisum	+	1
Agropyron smithii	+	1	Lupinus pusillus	+	1
Bouteloua gracilis	+	1	Psoralea lanceolata	3	1
Carex stenophylla	+	1	Senecio spartioides	+	1
Oryzopsis hymenoides	3	1			
Sporobolus cryptandrus	1	1			
Stipa comata	2	1			

COMMUNITY COVER

Tree layer 0 % Shrub layer 20 % Herb layer 60 %
Cryptogamic layer 0 % Litter 15 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H.2-4 Date 6-24-91 Workers ACB, SCS, GJ, CO
Location POND SW OF DUNES
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40N R13E Parent material AEOLIAN SAND
Altitude 7720' Slope 1° Exposure 250° Topographic Shading (1-3) 2
Vegetation cluster category MARSH-BANK
Evidence of historic use
Seral stage MID TO LATE Condition or trend GOOD-MODERATE. MAJOR DUNE ENCROACHMENT
plot photographed yes x negative no. 2844-22

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Aster adscendens	+ 1
		Cirsium arvense	+ 1
Shrubs		Conyza canadensis	+ 1
Salix exigua	3 1	Epilobium glandulosum	3 1
		Ranunculus cymbalaria	+ 1
Graminoids		Senecio spartioides	+ 1
Bouteloua gracilis	+ 1	Taraxacum officinale	+ 1
Eleocharis palustris	4 1		
Juncus balticus	+ 1		
Muhlenbergia asperifolia	+ 1		
Puccinellia nuttalliana	+ 1		
Scirpus acutus	2 1		
Typha latifolia	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 28 % Herb layer 85 %
Cryptogamic layer 0 % Litter 45 % Rock (>1cm) 0 % Bare soil 15 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H.2-9.5 Date 6-21-91 Workers SCS, CND
Location MOUTH OF MOSCA CREEK CANYON, LOG #16 ON NATURE TRAIL
NOTE: THIS PLOT IS SLIGHTLY OUTSIDE THE PARK UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material ALLUVIUM
Altitude 8280' Slope 6° Exposure 270° Topographic Shading (1-3) 2
Vegetation cluster category STREAMBANK-MOUNTAINSIDE
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2834-4

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	3 1	Androsace septentrionalis	+ 1
Populus angustifolia	1 1	Arabis hirsuta	+ 1
Populus tremuloides	2 1	Clematis columbiana	+ 1
		Senecio tridenticulatus	+ 1
Shrubs		Solidago sparsiflora	+ 1
Acer glabrum	2 1	Taraxacum officinale	+ 1
Prunus virginianus	+ 1	Thalictrum fendleri	3 1
Rosa woodsii	+ 1	Vicia americana	+ 1
Symphoricarpos oreophilus	1 1		
Graminoids			
Bromus anomalus	+ 1		
Carex	3 5		
Poa praetensis	3 5		

COMMUNITY COVER

Tree layer 60 % Shrub layer 20 % Herb layer 90 %
Cryptogamic layer 5 % Litter 99 % Rock (>1cm) 8 % Bare soil 2 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. H.4-9.3 Date 18 JULY 91 Workers SCS
Location ASPENS E OF VISITORS CENTER. FROM S SIDE OF HWY CULVERT, GO TO TREES AND THEN 30-50M S
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material ALLUVIUM AND SAND
Altitude 8200' Slope 8° Exposure 295° Topographic Shading (1-3) 1
Vegetation cluster category STREAMBANK-MOUNTAINSIDE
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes x negative no. 6700-15,18

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Juniperus scopulorum	1 1	Penstemon barbatus	+ 1
Populus tremuloides	5 4	Solidago sparsiflora	+ 1
Shrubs			
Rhus trilobata	+ 1		
Symphoricarpos oreophilus	+ 1		
Graminoids			
Agropyron trachycaulum	2 2		
Oryzopsis micrantha	2 3		
Poa fendleriana	+ 1		
Poa praetensis	+ 1		

COMMUNITY COVER

Tree layer 80 % Shrub layer 1 % Herb layer 10 %
Cryptogamic layer 0 % Litter 95 % Rock (>1cm) 1 % Bare soil 0 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. 1-3.5 Date 6-19-91 Workers ACS
Location WEST BOUNDARY. PLOT IS ..M E OF FENCE. MARKER FOUND?
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40N R12E Parent material AEOLIAN SAND
Altitude 7720' Slope 8° Exposure 130° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2844-19

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Ambrosia acanthicarpa	+ 1
		Corispermum nitidum	+ 1
Shrubs		Cycloloma atriplicifolia	+ 1
-none-		Helianthus petiolaris	+ 1
		Oenothera coronopifolia	+ 1
Graminoids		Psoralea lanceolata	3 1
Oryzopsis hymenoides	+ 1	Salsola kali	+ 1
Redfieldia flexousa	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 28 %
Cryptogamic layer 0 % Litter 8 % Rock (>1cm) 0 % Bare soil 64 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I-5 Date 6-15-91 Workers ACB, GJ, SCS, CO
Location SW OF DUNES. SURVEY MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40N/27S R13E/73W Parent material AEOLIAN SAND
Altitude 7760' Slope 2° Exposure 175° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-5

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	+ 1
		Cryptantha jamesii	+ 1
Shrubs		Descurainia richardsonii	+ 1
Chrysothamnus nauseosus	+ 1	Eriogonum cernuum	+ 1
		Gilia leptomeria	+ 1
Graminoids		Helianthus petiolaris	+ 1
Agropyron smithii	+ 1	Lygodesmia juncea	+ 1
Oryzopsis hymenoides	2 1	Oenothera coronopifolia	+ 1
Redfieldia flexuosa	2 1	Rumex venosus	2 1
Sporobolus cryptandrus	3 1	Senecio spartioides	+ 1
Stipa comata	+ 1	unk	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 1 % Herb layer 70 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I-6 Date 7-18-91 Workers SCS, ACB, GLJ, CO
Location S OF DUNES. SURVEY MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 7820' Slope EST. 5° Exposure EST. 270° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 2844-15

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
-none-

Forbs

Ambrosia acanthicarpa	+ 1
Chenopodium leptophyllum	+ 1
Corispermum nitidum	+ 1
Oenothera coronopifolia	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 1 %
Cryptogamic layer 0 % Litter 2 % Rock (>1cm) 30 % Bare soil 68 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I-6A Date 6-18-91 Workers ACB, GJ, SC, CO
Location S OF DUNES. MEDANO CREEK NORTH TERMINAL PONDING AREA
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material AEOLIAN SAND, ALLUVIUM
Altitude 7820' Slope 10° Exposure 180° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage EARLY-MID Condition or trend MODERATE, DUE TO REPEATED FLOODING
plot photographed yes X negative no. 2844-16

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Ambrosia acanthicarpa	+ 1
		Corispermum nitidum	+ 1
Shrubs		Cycloloma atriplicifolia	+ 1
Chrysothamnus nauseosus	1 1	Lygodesmia juncea	2 1
		Psoralea lanceolata	+ 1
Graminoids			
Oryzopsis hymenoides	2 1		
Redfieldia flexuosa	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 3 % Herb layer 35 %
Cryptogamic layer 0 % Litter 15 % Rock (>1cm) 0 % Bare soil 47 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I-7 Date 6-24-91 Workers SCS, ACB, GLJ. CO
Location S OF DUNES, FLATS ALONG MEDANO CREEK. SURVEY MARKER NOT FOUND. DUE TO LACK OF VEGETATION PLOT WAS PLACED 240M N OF CORNER. SAND TRAP #2 IS ABOUT 300M NE OF CORNER UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material SAND AND ALLUVIUM
Altitude 7880' Slope 1° Exposure 210° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend MODERATE TO FAIR. INTERDUNES BARE DUE TO FLOODING
plot photographed yes x negative no. 2834-17

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
-none-

Forbs
Psoralea lanceolata 2 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 15 %
Cryptogamic layer 0 % Litter 1 % Rock (>1cm) 50 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I-7A Date 6-24-91 Workers ACB, GJ, SCS, CO
Location S OF DUNES. 375M SOUTH OF I-7 SURVEY CORNER, EDGE OF HILLS S OF FLATS ALONG MEDANO CREEK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 7900' Slope 3° Exposure 180° Topographic Shading (1-3) 2
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2834-18

RECONNAISSANCE DATA
cover/sociability

Trees			Forbs		
-none-			Artemisia drancunculus		+ 1
			Chenopodium leptophyllum		1 1
Shrubs			Cryptantha fendleri		+ 1
Chrysothamnus nauseosus		2 1	Descurainia richardsonii		+ 1
Opuntia polycantha		2 1	Gilia longifolia		+ 1
Yucca glauca		2 1	Helianthus petiolarus		+ 1
			Lithospermum incisum		+ 1
Graminoids			Psoralea lanceolata		1 1
Muhlenbergia pungens		2 1	Senecio spartioides		1 1
Oryzopsis hymenoides		2 1			
Redfieldia flexuosa		+ 1			
Sporobolus cryptandrus		2 1			
Stipa comata		1 1			

COMMUNITY COVER

Tree layer 0 % Shrub layer 30 % Herb layer 55 %
Cryptogamic layer 0 % Litter 30 % Rock (>1cm) 0 % Bare soil 30 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I-8 Date 6-18-91 Workers ACB, GJ, SC, CO
Location 3/4 MI W OF ENTRANCE STATION. SURVEY MARKER NOT FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 8000' Slope 1° Exposure 175° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-11

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	+ 1
		Corispermum nitidum	+ 1
Shrubs		Helianthus petiolaris	+ 1
Chrysothamnus nauseosus	2 1	Oenothera coronopifolia	+ 1
		Psoralea lanceolata	3 1
Graminoids			
Muhlenbergia pungens	1 1		
Oryzopsis hymenoides	3 1		
Sitanion hystrix	+ 1		
Sporobolus cryptandrus	1 1		
Stipa comata	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 6 % Herb layer 60 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 30 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I-9 Date 6-14-91 Workers SCS & ACB
Location EAST BOUNDARY BEHIND HEADQUARTERS. PLOT IS ..M NW OF FENCE CORNER & MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material ALLUVIUM
Altitude 8200' Slope 8° Exposure 305° Topographic Shading (1-3) 1
Vegetation cluster category SAND-MOUNTAINSIDE
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2844-1

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	+ 1	Androsace septentrionalis	+ 1
Pinus edulis	3 1	Arabis hoelboellii var. retrofracta	+ 1
		Artemisia frigida	+ 1
Shrubs		Castilleja linariifolia	+ 1
Chrysothamnus parryi	+ 1	Chenopodium fremontii	+ 1
Chrysothamnus viscidiflorus	+ 1	Chenopodium leptophyllum	+ 1
Opuntia polycantha	+ 2	Cryptantha jamesii	+ 1
Ribes cereum	+ 1	Cymopterus acaulis	+ 1
Symphoricarpos oreophilus	+ 1	Descurainia pinnata	+ 1
		Descurainia richardsonii	+ 1
Graminoids		Erysimum asperum	+ 1
Bouteloua gracilis	1 2	Gilia agreggata	+ 1
Carex rossii	+ 2	Hymenopappus filifolius	+ 1
Muhlenbergia pungens	1 2	Hymenoxys richardsonii	1 1
Oryzopsis micrantha	1 2	Lappula redowskii	+ 1
Sitanion hystrix	+ 1	Lupinus pusillus	+ 1
Sporobolus cryptandrus	+ 1	Penestemon angustifolius	+ 1
Stipa comata	2 2	Senecio tridenticulatus	1 1
		Taraxacum officinale	+ 1

COMMUNITY COVER

Tree layer 40 % Shrub layer 3 % Herb layer 25 %
Cryptogamic layer 15 % Litter 35 % Rock (>1cm) 2 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I-9.5 Date 6-14-91 Workers SCS, ACB
Location EAST FENCE AT MORRIS GULCH. PLOT CENTER IS 10M? NW OF CORNER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material ALLUVIUM
Altitude 8480' Slope 10° Exposure 322° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2844-2

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Juniperus scopulorum	1 1	Allium cernum	+ 1
Populus angustifolia	1 1	Arabis hoelboellii var. retrofracta	+ 1
Pseudotsuga menziesii	+ 1	Artemisia frigida	+ 1
		Astragalus parryi	+ 1
Shrubs		Castilleja linariifolia	+ 1
Holodiscus dumosus	3 1	Chenopodium leptophyllum	+ 1
Opuntia polycantha	1 2	Descurainia pinnata	+ 1
Symphoricarpos oreophilus	+ 1	Erigeron flagellaris	1 1
		Eriogonum jamesii	+ 1
Graminoids		Erysimum asperum	+ 1
Bouteloua gracilis	1 2	Euphorbia robusta	+ 1
Carex rossii	1 2	Gayophytum diffusum	+ 1
Oryzopsis micrantha	+ 1	Heterotheca villosa	+ 1
Poa fendleriana	1 1	Hymenoxys richardsonii	1 1
Stipa comata	+ 1	Lappula redowskii	+ 1
		Lesquerella montana	1 1
		Penstemon barbatus	+ 1
		Polygonum douglasii	+ 1
		Senecio tridenticulatus	1 1

COMMUNITY COVER

Tree layer 20 % Shrub layer 40 % Herb layer 40 %
Cryptogamic layer 2 % Litter 70 % Rock (>1cm) 4 % Bare soil 5 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. 1.3-6 Date 6-18-91 Workers ACB, GJ, SCS, CO
Location S OF DUNES. MEDANO CREEK SOUTH TERMINAL PONDING AREA
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material SANDY ALLUVIUM
Altitude 7820' Slope 2° Exposure 260° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage EARLY Condition or trend POOR. NATURAL DISTURBANCE DUE TO FLOODING
plot photographed yes X negative no. 2844-17

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Chenopodium leptophyllum	1 1
		Cryptantha fendleriana	+ 1
Shrubs		Descurainia richardsonii	2 1
-none-		Portulaca oleracea	2 1
		Salsola kali	1 1
Graminoids			
Agropyron intermedium	2 1		
Oryzopsis hymenoides	1 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 45 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 0 % Bare soil 35 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. I.4-7.4 Date 6-24-91 Workers ACB, GJ, SCS, CO
Location S OF DUNES. BOTTOM OF BIG SW-NE VALLEY S OF MEDANO CREEK
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material SAND, AND ALLUVIUM?
Altitude 7940' Slope 3° Exposure 260° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2834-19

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	+ 1
		Comandra umbellata	1 1
Shrubs		Cryptantha jamesii	+ 1
Chrysothamnus nauseosus	+ 1	Descurainia richardsonii	+ 1
Chrysothamnus parryi	3 1	Helianthus petiolarus	+ 1
Opuntia polycantha	3 1	Lithospermum incisum	+ 1
		Psoralea lanceolata	+ 1
Graminoids		Senecio spartioides	+ 1
Bouteloua gracilis	1 1		
Muhlenbergia pungens	2 1		
Oryzopsis hymenoides	2 1		
Sitanion hystrix	+ 1		
Sporobolus cryptandrus	1 1		
Stipa comata	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 60 % Herb layer 50 %
Cryptogamic layer 0 % Litter 40 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J-3.5 Date 6-19-91 Workers ACB, GJ, SC, CO
Location W BOUNDARY SW OF DUNES. PLOT CENTER IS 25 M NE OF SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40N R12E Parent material AEOLIAN SAND
Altitude 7680' Slope 2° Exposure 90° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use OLD BUFFALO/COW DUNG FROM TRESPASS
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 2844-18

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Ambrosia acanthicarpa	+ 1
		Corispermum nitidum	+ 1
Shrubs		Cycloloma atriplicifolia	+ 1
-none-		Helianthus petiolaris	1 1
		Oenothera coronopifolia	+ 1
Graminoids		Psoralea lanceolata	2 1
Oryzopsis hymenoides	2 1	Salsola kali	+ 1
Redfieldia flexuosa	1 1	Senecio spartioides	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 30 %
Cryptogamic layer 0 % Litter 15 % Rock (>1cm) 0 % Bare soil 55 %

Cover classes		Sociability classes	
< 1%	+	Growing as single, widely spaced individuals	- 1
1 - 5%	1	Small groups	- 2
6 - 25%	2	In small patches	- 3
26 - 50%	3	Extensive patches	- 4
51 - 75%	4	In nearly pure stands	- 5
76 - 95%	5		
>95%	6		

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J-5 Date 6-15-91 Workers ACB, GJ, SC, CO
Location SW OF DUNES. SURVEY MARKER AT CENTER OF PLOT
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40N/27S R13E/73W Parent material AEOLIAN SAND
Altitude 7740' Slope 6° Exposure 275° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2844-4

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	+ 1
		Descurainia richardsonii	+ 1
Shrubs		Gilia aggregata	+ 1
Chrysothamnus nauseosus	+ 1	Helianthus petiolaris	+ 1
Yucca glauca	+ 1	Lygodesmia juncea	+ 1
		Oenothera coronopifolia	+ 1
Graminoids		Senecio spartioides	+ 1
Muhlenbergia pungens	2 1		
Oryzopsis hymenoides	2 1		
Redfieldia flexuosa	3 1		
Sporobolus cryptandrus	1 4		
Stipa comata	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 1 % Herb layer 60 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 30 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J-6 Date 6-18-91 Workers ACB, GJ, SCS, CO
Location S OF DUNES. SURVEY MARKER FOUND
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked SURVEY MARKER
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 7820' Slope 2° Exposure 345° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use VERY OLD BARBED WIRE IN VICINITY OF PLOT
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2844-14

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Cryptantha jamesii	+ 1
		Descurainia pinnata	+ 1
Shrubs		Gilia longiflora	+ 1
Chrysothamnus nauseosus	2 1	Helianthus petiolaris	+ 1
Chrysothamnus parryi	2 1	Oenothera coronopifolia	+ 1
Opuntia polycantha	+ 1	Psoralea lanceolata	1 1
		Senecio spartioides	1 1
Graminoids			
Bouteloua gracilis	3 1		
Muhlenbergia pungens	+ 1		
Oryzopsis hymenoides	2 1		
Sporobolus cryptandrus	1 1		
Stipa comata	2 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 15 % Herb layer 40 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 0 % Bare soil 30 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J-7 Date 6-17-91 Workers ACB, GJ, SCS, CO
Location S OF DUNES. SURVEY MARKER AT CENTER OF PLOT
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 7900' Slope 2° Exposure 340° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2834-16

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Astragalus ceramaicus	+ 1
		Corispermun nitidum	+ 1
Shrubs		Descurainia richardsonii	+ 1
Chrysothamnus nauseosus	2 1	Helianthus petiolaris	+ 1
Yucca glauca	+ 1	Machaeranthera canescens	+ 1
		Oenothera coronopifolia	+ 1
Graminoids		Psoralea lanceolata	2 1
Muhlenbergia pungens	3 1		
Oryzopsis hymenoides	2 1		
Sporobolus cryptandrus	1 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 12 % Herb layer 60 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 5 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J-8 Date 6-17-91 Workers ACB, GLJ
Location BELOW ENTRANCE ROAD. PLOT CENTER AT SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked SURVEY MARKER
Township and Range T27S R73W Parent material AEOLIAN SAND, AND ALLUVIUM?
Altitude 7980' Slope 5° Exposure 248° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2859-4

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Artemisia drancunculus	+ 1
		Chenopodium leptophyllum	+ 1
Shrubs		Helianthus petiolaris	+ 1
Chrysothamnus nauseosus	+ 1	Lithospermum incisum	+ 1
Chrysothamnus parryi	1 1	Lygodesmia juncea	+ 1
Opuntia polycantha	1 1	Mentzelia albicaulis	+ 1
		Oenothera coronopifolia	+ 1
Graminoids		Senecio spartioides	+ 1
Agropyron smithii	1 1	Sphaeralcea coccinea	1 1
Bouteloua gracilis	2 1		
Muhlenbergia pungens	+ 1		
Oryzopsis hymenoides	3 1		
Sporobolus cryptandrus	2 1		
Stipa comata	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 3 % Herb layer 60 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 1 % Bare soil 25 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J-9 Date 6-17-91 Workers ACB, GLJ
Location E BOUNDARY S OF EVANS GULCH. PLOT CENTER IS 7M W OF SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 8560' Slope 32° Exposure 318° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2859-2

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Juniperus scopulorum	2 1	Androsace septentrionalis	+ 1
Pinus edulis	2 1	Antennaria rosea	+ 1
		Artemisia frigida	2 1
Shrubs		Chenopodium fremontii	+ 1
Cercocarpus montanus	+ 1	Chenopodium leptophyllum	+ 1
Chrysothamnus viscidiflorus	1 1	Descurainia richardsonii	+ 1
Holodiscus dumosus	1 1	Drabis lignifera	+ 1
Opuntia polycantha	2 1	Erigeron flagellaris	+ 1
Ribes cereum	1 1	Erigeron speciosus	+ 1
Symphoricarpos oreophilus	1 1	Erysimum asperum	+ 1
		Heterotheca villosa	+ 1
Graminoids		Heuchera parviflora	2 1
Festuca ovina	+ 1	Lappula redowskii	+ 1
Muhlenbergia montana	+ 1	Sedum lanceolatum	1 1
Oryzopsis micrantha	2 1		
Poa fendeleriana	3 1		
Sitanion hystrix	1 1		
Stipa comata	1 1		

COMMUNITY COVER

Tree layer 60 % Shrub layer 20 % Herb layer 60 %
Cryptogamic layer 10 % Litter 40 % Rock (>1cm) 5 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J.3-7.7 Date 6-24-91 Workers ACB, GLJ
Location 125M W OF HWY & 0.4 MILE S OF RD TO DENTON SPRINGS
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material SAND, AND ALLUVIUM?
Altitude 7940' Slope 2° Exposure 352° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES-MARSH
Evidence of historic use
Seral stage LATE Condition or trend GOOD

plot photographed yes X negative no. 2859-13

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Bahia neomexicana	+ 1
		Chenopodium leptophyllum	+ 1
Shrubs		Corydalis aurea	+ 1
-none-		Cryptantha jamesii	+ 1
		Descurainia richardsonii	+ 1
Graminoids		Helianthus petiolaris	1 1
Agropyron smithii	3 1	Lygodesmia juncea	1 1
Bouteloua gracilis	+ 1	Portulaca oleracea	3 1
Muhlenbergia pungens	+ 1	Salsola kali	1 1
Oryzopsis hymenoides	+ 1	Sphaeralcea coccinea	+ 1
Sitanion hystrix	+ 1		
Sporobolus cryptandrus	1 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 70 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 2 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J.4-7.7 Date 6-24-91 Workers ACB, GLJ
Location BELOW ENTRANCE ROAD. JUST SOUTH OF PLOT J.3-7.7
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material SAND, AND ALLUVIUM?
Altitude 7940' Slope 4° Exposure 328° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2859-14

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	+ 1
		Cryptantha fendleri	+ 1
Shrubs		Euphorbia glyptosperma	+ 1
Ceratoides lanata	3 1	Helianthus petiolaris	1 1
Chrysothamnus nauseosus	+ 1	Mentzelia multiflora	+ 1
Gutierrezia sarothrae	1 1	Portulaca oleracea	+ 1
		Salsola kali	+ 1
Graminoids		Senecio spartioides	+ 1
Bouteloua gracilis	2 1	Sphaeralcea coccinea	1 1
Sitanion hystrix	+ 1	Tripterocalyx micranthus	+ 1
Sporobolus cryptandrus	1 1		
Stipa comata	+ 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 50 % Herb layer 35 %
Cryptogamic layer 2 % Litter 20 % Rock (>1cm) 8 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J.5-8.5 Date 6-24-91 Workers SCS, CO
Location DENTON SPRING
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material ALLUVIUM
Altitude 8360' Slope 12° Exposure 320° Topographic Shading (1-3) 2
Vegetation cluster category MARSH-STREAMBANK
Evidence of historic use EXTREME WEEDINESS IN AND NEAR PLOT. CHRONICALLY TRAMPLED BARE (AND SALTED?) BEFORE PARK
Seral stage DRY PART EARLY, & WET LATER Condition or trend POOR. RECOVERY OF DRIER PORTIONS VERY SLOW
plot photographed yes X negative no. 2843-21

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Juniperus scopulorum	1 1	Achillea lanulosa	1 1
		Artemisia frigida	1 1
Shrubs		Epilobium glandulosum	+ 1
Chrysothamnus nauseosus	1 1	Erysimum asperum	+ 1
Rosa woodsii	+ 1	Glycyrrhiza lepidota	1 1
		Helianthus annuus	+ 1
Graminoids		Heterotheca villosa	+ 1
Agropyron trachycaulum	1 1	Kochia scoparia	2 1
Agrostis scabra	2 4	Lactuca tatarica	2 1
Agrostis stolonifera	+ 1	Lappula redowskii	+ 1
Bromus ciliatus	+ 1	Lepidium montanum	+ 1
Carex	+ 1	Melilotus officinale	+ 1
Carex	1 1	Mentha arvensis	1 1
Carex nebraskensis	1 1	Polygonum aviculare	+ 1
Juncus balticus	4 1	Potentilla anserina	1 1
Poa pratensis	5 5	Taraxacum officinale	+ 1
Stipa comata	1 1	Tragopogon dubius	+ 1
Typha latifolia	+ 1		

COMMUNITY COVER

Tree layer 2 % Shrub layer 5 % Herb layer 90 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 3 % Bare soil 3 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J.8-9 Date 6-17-91 Workers SCS, CO
Location PARK CORNER ABOVE DENTON SPRING. LOCATED BY TOPOGRAPHY & BY LINE OF TREES CUT FOR SURVEYING. NO MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 9400' Slope 47° Exposure 310° Topographic Shading (1-3) 3
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use MODERATELY INACCESSIBLE
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2844-8

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Abies concolor	1 1	Androsace septentrionalis	+ 1
Juniperus scopulorum	2 1	Arabis hoelboellii var. secunda	+ 1
Pinus edulis	+ 1	Arenaria fendleri	+ 1
		Artemisia frigida	+ 1
Shrubs		Brickellia grandiflora	+ 1
Holodiscus dumosus	1 1	Erigeron speciosus	+ 1
Jamesia americana	+ 1	Erigeron vetensis	+ 1
Physocarpus monogynus	2 3	Eriogonum jamesii	+ 1
Ribes cereum	+ 1	Erysimum asperum	+ 1
Symphoricarpos oreophilus	1 1	Heuchera parviflora	+ 1
		Leptodactylon pungens	+ 1
Graminoids		Packera werneriifolia	+ 1
Festuca ovina	2 1	Saxifraga bronchialis	2 3
Koeleria nitida	+ 1	Sedum lanceolatum	+ 1
Poa fendleriana	1 1	Selaginella densa	+ 1
		Senecio pudicus	+ 1
		Valeriana capitata	1 1

COMMUNITY COVER

Tree layer 15 % Shrub layer 30 % Herb layer 20 %
Cryptogamic layer 50 % Litter 25 % Rock (>1cm) 50 % Bare soil 5 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. J.8-9A Date 6-17-91 Workers SCS, CO
Location SADDLE OF RIDGE ON N OF NORTH ARRASTRE CREEK. NOTE: PLOT, WHICH IS ABOUT .1 MI S OF CORNER, IS SLIGHTLY OUTSIDE OF PARK UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material PRECAMBRIAN METAMORPHICS
Altitude 9480' Slope 26° Exposure 315° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use MODERATELY INACCESSIBLE
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2844-10

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
Pinus edulis	1 1	Arabis hoelboellii var. retrofracta	+ 1
Pseudotsuga menziesii	2 1	Artemisia frigida	2 1
		Eriogonum jamesii	1 1
Shrubs		Erysimum asperum	+ 1
Chrysothamnus nauseosus	+ 1	Heuchera parvifolia	+ 1
Opuntia polycantha	1 1	Hymenoxys richardsonii	+ 1
Ribes cereum	2 1	Potentilla gracilis	+ 1
Symphoricarpos oreophilus	1 1	Selaginella densa	+ 1
Graminoids			
Bouteloua gracilis	1 1		
Festuca ovina	3 4		
Muhlenbergia montana	1 3		
Poa fendleriana	1 1		

COMMUNITY COVER

Tree layer 15 % Shrub layer 17 % Herb layer 70 %
Cryptogamic layer 22 % Litter 15 % Rock (>1cm) 20 % Bare soil 10 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. K-5 Date 6-15-91 Workers ACB, GLJ, SCS, CO
Location S BOUNDARY. PLOT CENTER IS ..M NE OF CORNER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T40N/27S R13E/73W Parent material AEOLIAN SAND
Altitude 7740' Slope est. 2° Exposure est. 20° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage MID Condition or trend GOOD
plot photographed yes X negative no. 2844-3

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Ambrosia acanthicarpa	+ 1
		Crypantha fendleri	+ 1
Shrubs		Descurainia richardsonii	+ 1
Chrysothamnus nauseosus	+ 1	Helianthus petiolaris	1 1
		Oenothera coronopifolia	+ 1
Graminoids		Psoralea lanceolata	3 3
Muhlenbergia pungens	2 3	Senecio spartioides	+ 1
Oryzopsis hymenoides	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer + % Herb layer 65 %
Cryptogamic layer % Litter 15 % Rock (>1cm) 0 % Bare soil 20 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. K-6 Date 6-21-91 Workers ACB, GLJ
Location SOUTH BOUNDARY. PLOT CENTER IS 15M NW OF SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 7820' Slope 2° Exposure 154° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2859-10

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	+ 1
		Descurainia richardsonii	+ 1
Shrubs		Helianthus petiolaris	1 1
Chrysothamnus nauseosus	2 1	Oenothera coronopifolia	+ 1
Opuntia polycantha	1 1	Psoralea lanoceolata	2 1
Yucca glauca	2 1	Senecio spartioides	1 1
Graminoids			
Muhlenbergia pungens	2 1		
Sitanion hystrix	2 1		
Sporobolus cryptandrus	2 1		
Stipa comata	3 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 15 % Herb layer 45 %
Cryptogamic layer 0 % Litter 20 % Rock (>1cm) 0 % Bare soil 50 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. K-7 Date 6-24-91 Workers ACB, GJ, SCS, CO
Location S BOUNDARY. PLOT CENTER IS 10M N OF SURVEY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 7880' Slope 4° Exposure 320° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage LATE Condition or trend GOOD
plot photographed yes X negative no. 2834-20

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Chenopodium leptophyllum	+ 1
		Descurainia richardsonii	+ 1
Shrubs		Helianthus petiolaris	+ 1
Chrysothamnus nauseosus	1 1	Lygodesmia juncea	+ 1
Chrysothamnus parryi	1 1	Oenothera coronopifolia	+ 1
Opuntia polycantha	+ 1	Psoralea lanceolata	+ 1
		Salsola kali	+ 1
Graminoids		Senecio spartioides	+ 1
Muhlenbergia pungens	3 1		
Oryzopsis hymenoides	3 1		
Sitanion hystrix	+ 1		
Sporobolus cryptandrus	1 1		

COMMUNITY COVER

Tree layer 0 % Shrub layer 12 % Herb layer 65 %
Cryptogamic layer % Litter 30 % Rock (>1cm) 0 % Bare soil 30 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. K-8 Date 6-17-90 Workers ACB, GLJ
Location S BOUNDARY. PLOT CENTER IS 7M NORTH OF SUREY MARKER
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked STEEL PEG
Township and Range T27S R73W Parent material ALLUVIUM
Altitude 8240' Slope 6° Exposure 317° Topographic Shading (1-3) 2
Vegetation cluster category MOUNTAINSIDE
Evidence of historic use
Seral stage CLIMAX Condition or trend GOOD
plot photographed yes X negative no. 2859-3

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
Pinus edulis	4 1	Androsace septentrionalis	+ 1
		Arabis lignifera	+ 1
Shrubs		Artemisa frigida	+ 1
Cercocarpus montanus	+ 1	Chenopodium fremontii	+ 1
Opuntia polycantha	1 1	Chenopodium leptophyllum	+ 1
Ribes cereum	+ 1	Descurainia richardsonii	+ 1
		Erysimum asperum	+ 1
Graminoids		Heterotheca villosa	1 1
Muhlenbergia montana	2 1	Hymenoxys richardsonii	+ 1
Poa fendeleriana	2 1	Penestemon barbatus	+ 1

COMMUNITY COVER

Tree layer 60 % Shrub layer 6 % Herb layer 20 %
Cryptogamic layer 15 % Litter 70 % Rock (>1cm) 10 % Bare soil 10 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST1 Date 17 JULY 91 Workers SCS
Location SAND TRAP #1 (F.8-5.4). PLOT CENTER IS 15M AT 120°
SW DUNES UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 7920' Slope 11° Exposure 300° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-9

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 3 2

Forbs
Psoralea lanceolata 1 2

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 30 %
Cryptogamic layer 0 % Litter 1 % Rock (>1cm) 0 % Bare soil 70 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST10 Date 16 JULY 91 Workers SCS
Location SAND TRAP #10 (C.2-8.7). PLOT CENTER IS 35M AT 275°
W OF LITTLE MEDANO CREEK UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8560' Slope 4° Exposure 170° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-0

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 3 3

Forbs
Helianthus petiolaris 2 2
Oenothera coronopifolia + 1
Psoralea lanceolata 2 2

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 35 %
Cryptogamic layer 0 % Litter 1 % Rock (>1cm) 0 % Bare soil 65 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST11 Date 16 JULY 91 Workers SCS
Location SAND TRAP #II (D.2-6.9). PLOT CENTER IS ..M AT ...°
NORTH INTERIOR UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8420' Slope 2° Exposure 230° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-1

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Forbs
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 1 2

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 10 %
Cryptogamic layer 0 % Litter +4 % Rock (>1cm) 0 % Bare soil 90 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST12 Date 18 JULY 91 Workers SCS
Location SAND TRAP #12 (6-9.3). PLOT CENTER IS 20M AT est. 140°
DUNE NEXT TO CREEK BELOW ESCAPED DUNE, NEAR BUCK CREEK UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 8160' Slope 9° Exposure 275° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use TRAILS: CURRENT USE BY PARK VISITORS
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-14

RECONNAISSANCE DATA
cover/sociability

Trees	
-none-	
Shrubs	
-none-	
Graminoids	
Redfieldia flexuosa	3 2
Forbs	
Lygodesmia juncea	2 1
Psoralea lanceolata	1 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 60 %
Cryptogamic layer 0 % Litter 5 % Rock (>1cm) 0 % Bare soil 40 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST2 Date 17 JULY 91 Workers SCS
Location SAND TRAP #2 (H.8-7.2). PLOT CENTER IS 15M AT 250°
SOUTH INTERIOR UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T27S R73W Parent material AEOLIAN SAND
Altitude 7900' Slope 4° Exposure 22° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-11

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
-none-

Forbs
Psoralea lanceolata 2 2

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 25 %
Cryptogamic layer 0 % Litter 2 % Rock (>1cm) 0 % Bare soil 75 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST3 Date 16 JUNE 91 Workers SCS
Location SAND TRAP #3 (A.9-5.2). PLOT CENTER IS 35M AT 175°
N EDGE OF DUNES NEAR SAND CREEK UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T25S R73W Parent material AEOLIAN SAND
Altitude 8120' Slope 21° Exposure 0° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-3

RECONNAISSANCE DATA
cover/sociability

Trees		Forbs	
-none-		Cirsium undulatus	1 1
		Corispermum nitidum	+ 1
Shrubs		Helianthus petiolaris	+ 1
-none-		Psoralea lanceolata	3 2

Graminoids	
Redfieldia flexuosa	1 2
Oryzopsis hymenoides	+ 1

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 50 %
Cryptogamic layer 0 % Litter 10 % Rock (>1cm) 0 % Bare soil 50 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST4 Date 17 JULY 91 Workers SCS
Location SAND TRAP #4 (C.8-5.1). PLOT CENTER IS 20M AT 225°
W EDGE OF DUNES UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8040' Slope 6° Exposure 295° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-7,8

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 1 2

Forbs
Helianthus petiolaris + 1
Psoralea lanceolata 3 2

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 45 %
Cryptogamic layer 0 % Litter 1 % Rock (>1cm) 0 % Bare soil 55 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST5 Date 16 JULY 91 Workers SCS
Location SAND TRAP #5 (D.7-9.2). PLOT CENTER IS 20M AT 165°
E EDGE OF DUNES ACROSS FROM HORSE CANYON UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT MARKED
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8480' Slope 3° Exposure 235° Topographic Shading (1-3) 1
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes X negative no. 6700-(-1)

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 2 3

Forbs
Psoralea lanceolata 1 2

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 25 %
Cryptogamic layer 0 % Litter 0 % Rock (>1cm) 0 % Bare soil 75 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST6 Date 18 JULY 91 Workers SCS
Location SAND TRAP #6 (F.6-8.9). PLOT CENTER IS EST. 100M AT 200°
E DUNES ACROSS FROM SAWMILL CANYON UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8480' Slope 16° Exposure 295° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-17

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Forbs
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 2 2

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 20 %
Cryptogamic layer 0 % Litter 4 % Rock (>1cm) 0 % Bare soil 80 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST7 Date 17 JULY 91 Workers SCS
Location SAND TRAP #7 (6.5-7.2). PLOT CENTER IS 20M AT 115°
S DUNES INTERIOR UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8400' Slope 9° Exposure 215° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-10

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 1 2

Forbs
Helianthus petiolaris + 1
Psoralea lanceolata 2 2

COMMUNITY COVER

Tree layer 0 % Shrub layer 0 % Herb layer 25 %
Cryptogamic layer 0 % Litter + % Rock (>1cm) 0 % Bare soil 75 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST8 Date 18 JULY 91 Workers SCS
Location SAND TRAP #8 (F.9-9.3). PLOT CENTER IS 50M AT 105°
ESCAPED DUNES NEAR BUCK CREEK WASH UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8160' Slope 12° Exposure 165° Topographic Shading (1-3) 1
Vegetation cluster category STABILIZED DUNES
Evidence of historic use
Seral stage EARLY-MID Condition or trend GOOD. HOWEVER DUNE IS KILLING MATURE VEGETATION
plot photographed yes x negative no. 6700-13

RECONNAISSANCE DATA
cover/sociability

Trees		**Forbs**	
-none-		Ambrosia acanthicarpa	1 1
		Corispermum nitidum	+ 1
Shrubs		Cycloloma atriplicifolia	+ 1
Chrysothamnus nauseosus	+ 1	Lygodesmia juncea	2 1
		Senecio spartioides	+ 1
Graminoids			
Oryzopsis hymenoides	2 2		
Redfieldia flexuosa	2 2		

COMMUNITY COVER

Tree layer 0 % Shrub layer + % Herb layer 45 %
Cryptogamic layer 0 % Litter 5 % Rock (>1cm) 0 % Bare soil 55 %

Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

GREAT SAND DUNES NATIONAL MONUMENT VEGETATION
USFS-INT SHRUB SCIENCES LABORATORY

Plot no. ST9 Date 16 JUNE 91 Workers SCS
Location SAND TRAP #9 (B.1-6.6). PLOT CENTER IS 35M AT 175°
UTM grid coordinates
Plot size 1/40 ACRE Plot shape CIRCULAR How marked NOT
Township and Range T26S R73W Parent material AEOLIAN SAND
Altitude 8680' Slope 1° Exposure 110° Topographic Shading (1-3) 2
Vegetation cluster category ACTIVE DUNES
Evidence of historic use
Seral stage EARLY Condition or trend GOOD
plot photographed yes x negative no. 6700-2

RECONNAISSANCE DATA
cover/sociability

Trees
-none-

Shrubs
-none-

Graminoids
Redfieldia flexuosa 2 2

Forbs
Cirsium undulatum + 1
Corispermum nitidum + 1

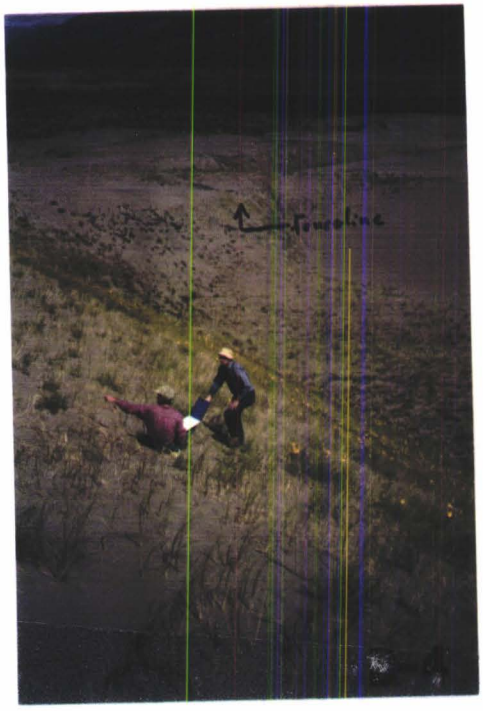
COMMUNITY COVER

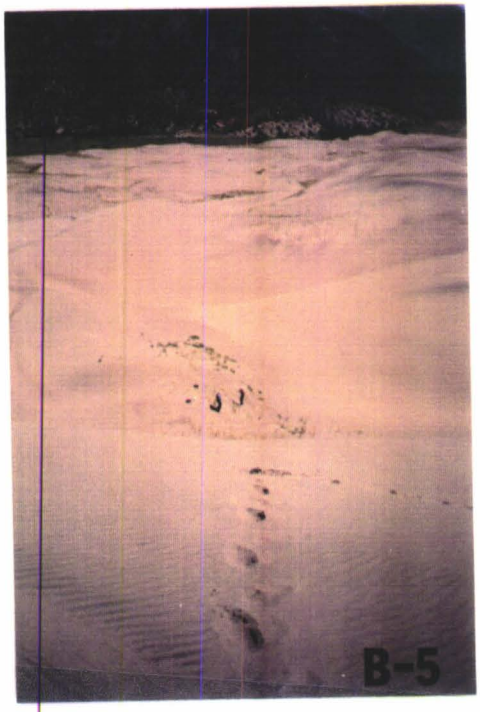
Tree layer 0 % Shrub layer 0 % Herb layer 10 %
Cryptogamic layer 0 % Litter 3 % Rock (>1cm) 0 % Bare soil 90 %

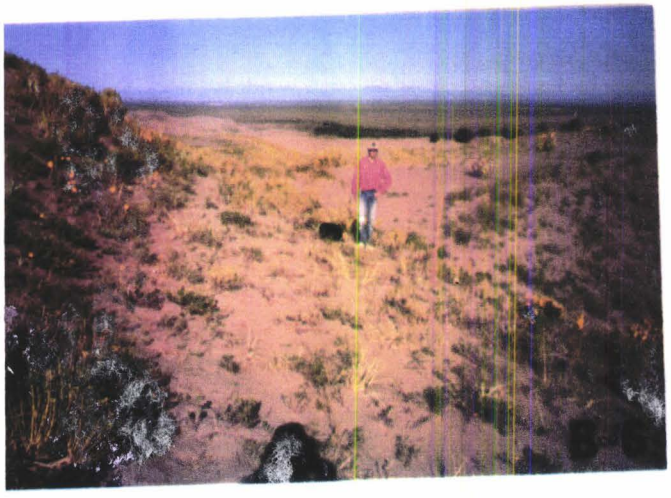
Cover classes	
< 1%	+
1 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 95%	5
>95%	6

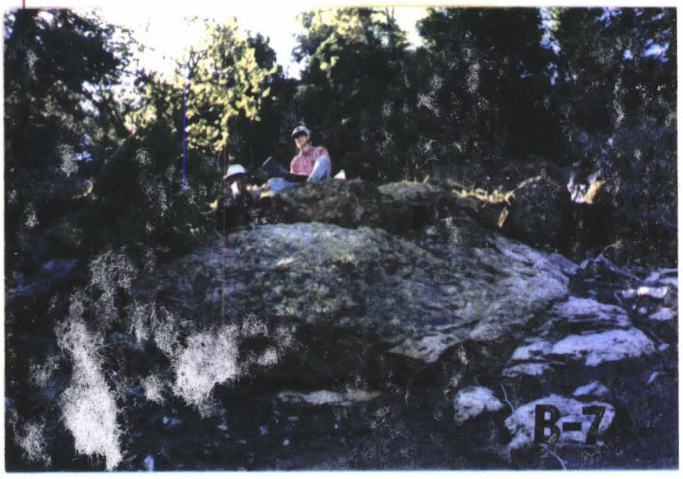
Sociability classes	
Growing as single, widely spaced individuals	- 1
Small groups	- 2
In small patches	- 3
Extensive patches	- 4
In nearly pure stands	- 5

A.6-4



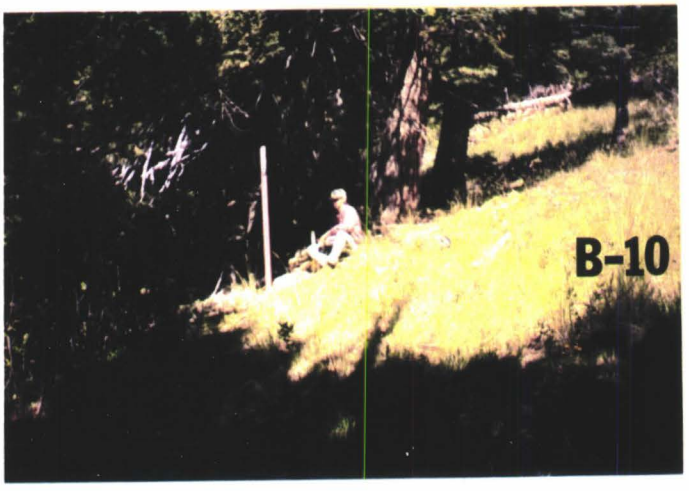


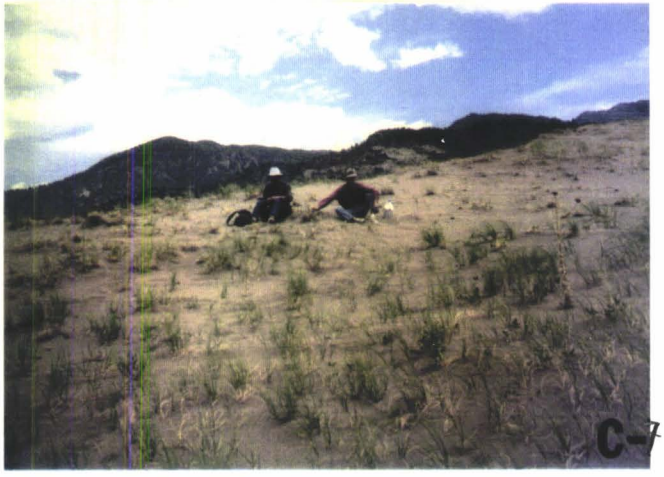


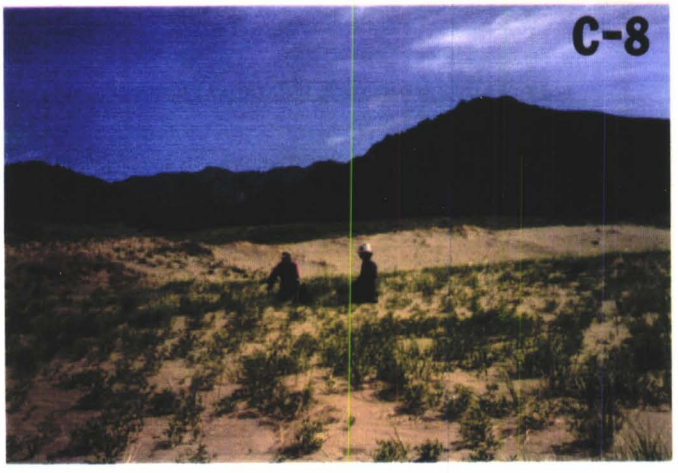


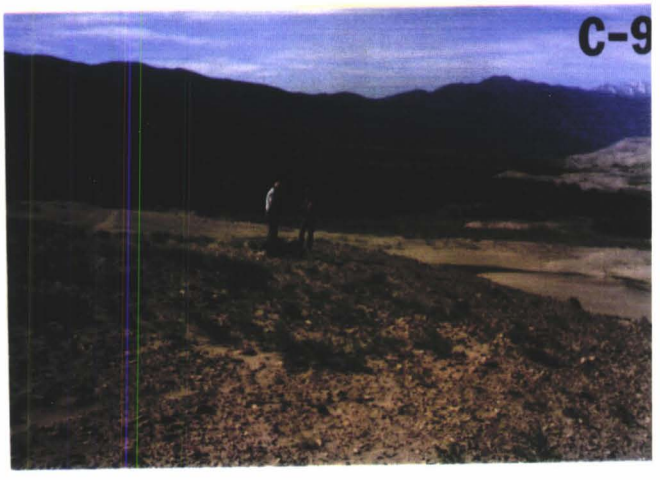
B-8

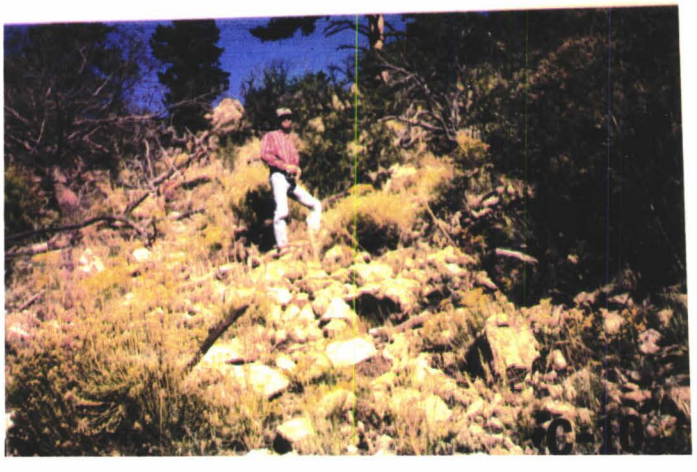
B-9


B-10

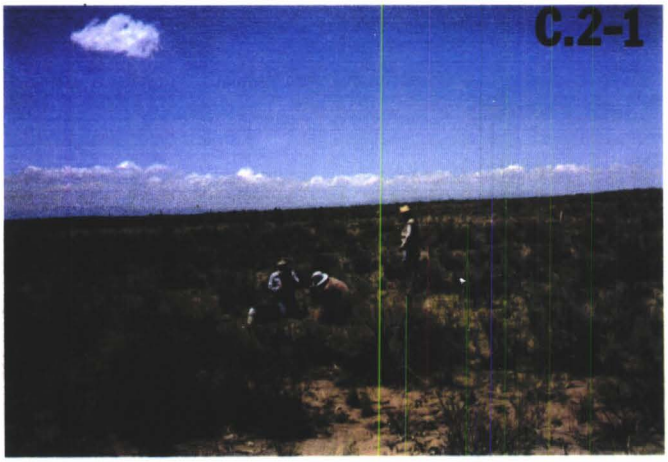

C-7


C-8

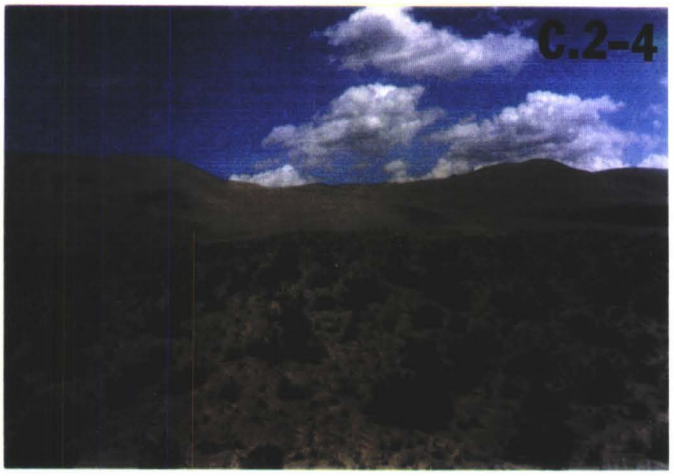

C-9


C-10

C-10


C.2-1

C.2-2


C.2-4

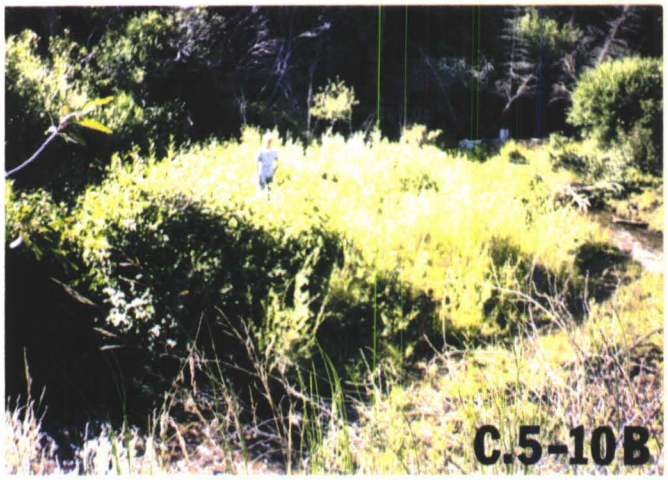
C.2-4A

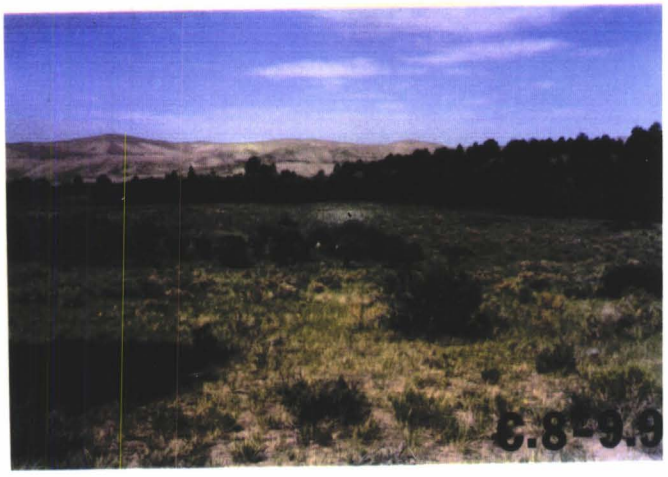
C.2-9.3N

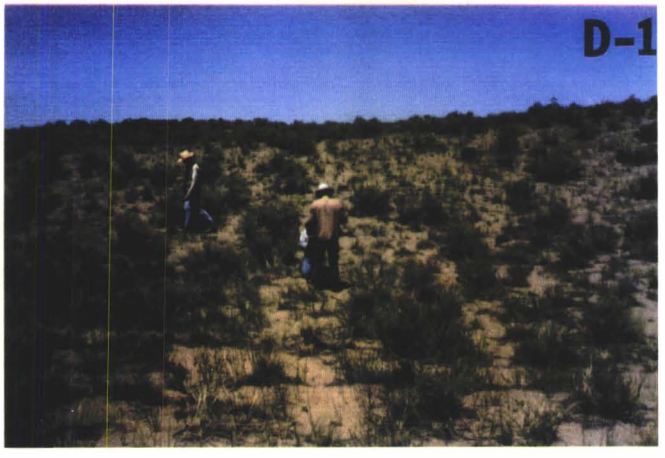
C.2-9.3N

C.2-9.3S

C.5-10A

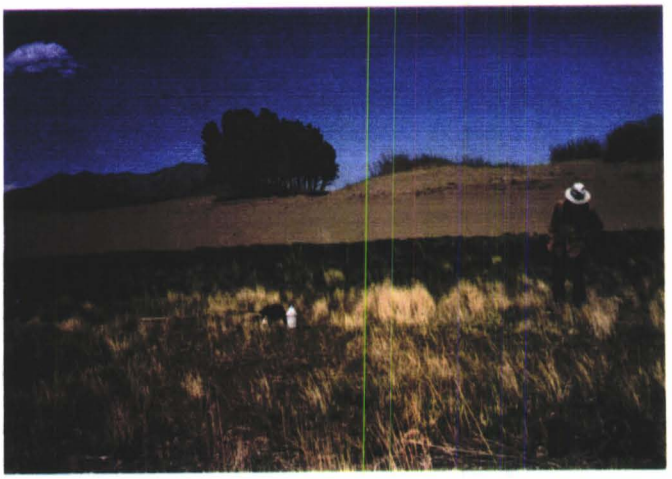

C.5-10B



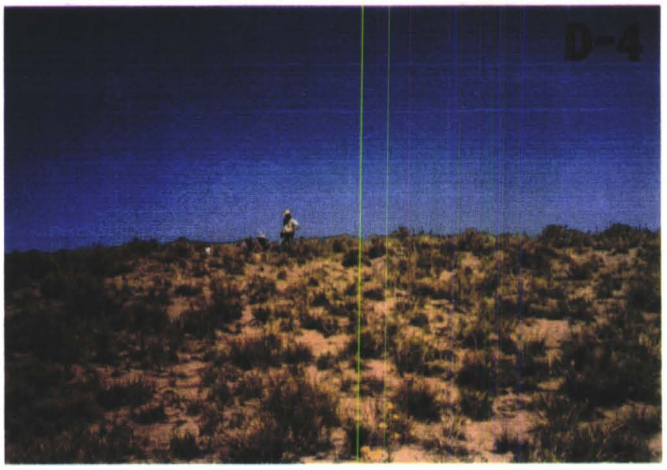

D-1

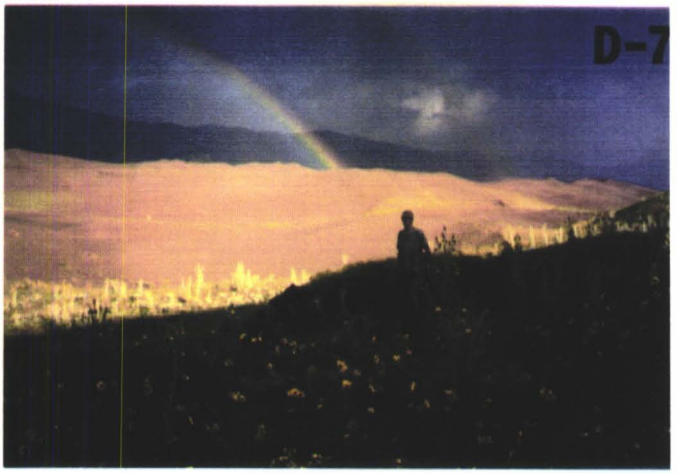
D-2

D-2A

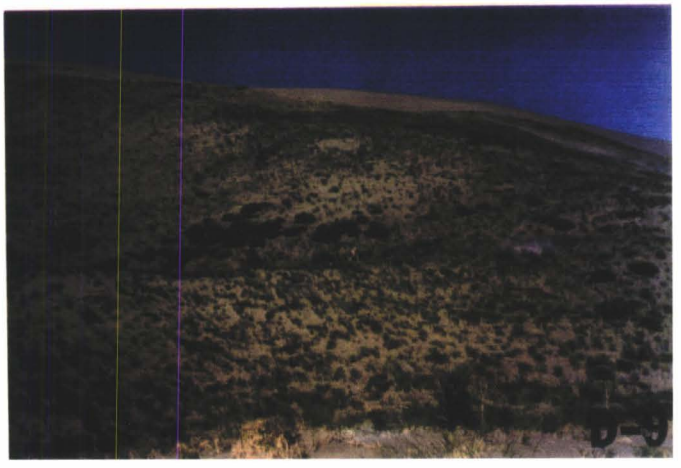


D-3

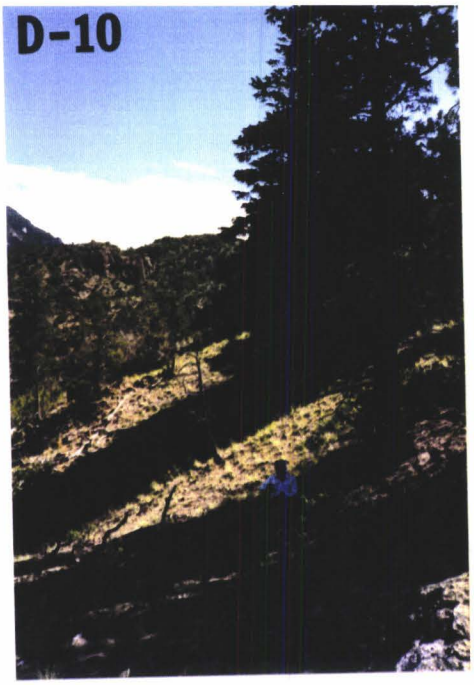

D-4


D-7

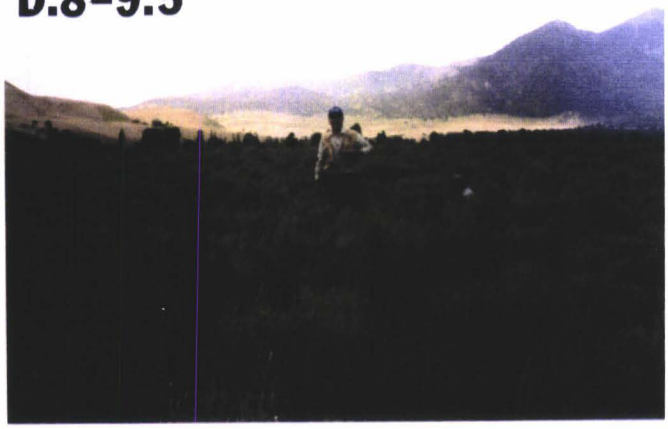
D-8



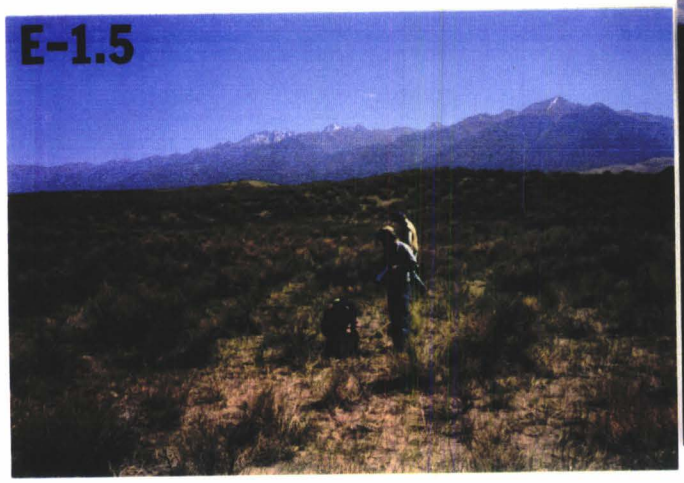
D-10



D.8-9.5

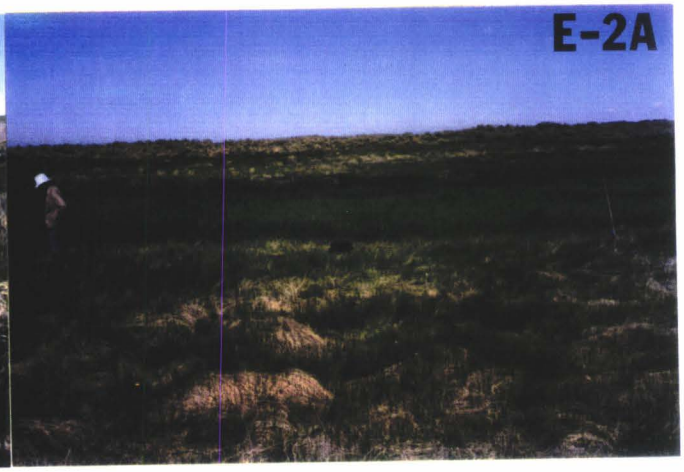


E-1.5

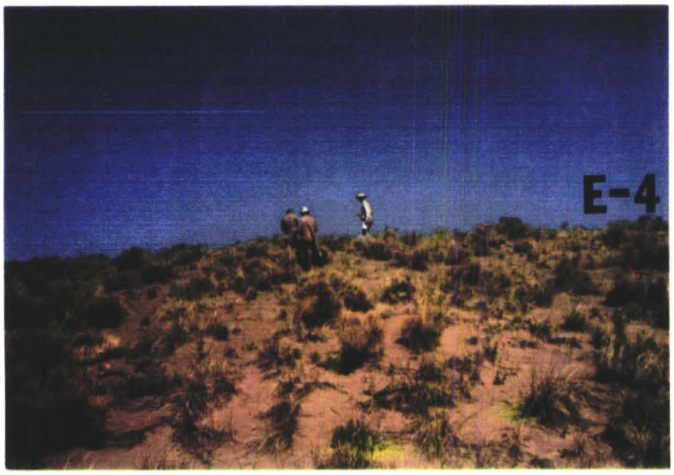


E-2

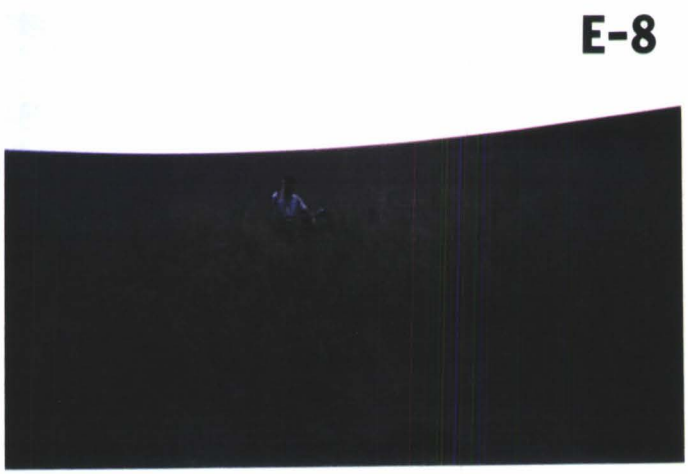
E-2A



E-2B


E-4

E-7


E-8

E-9

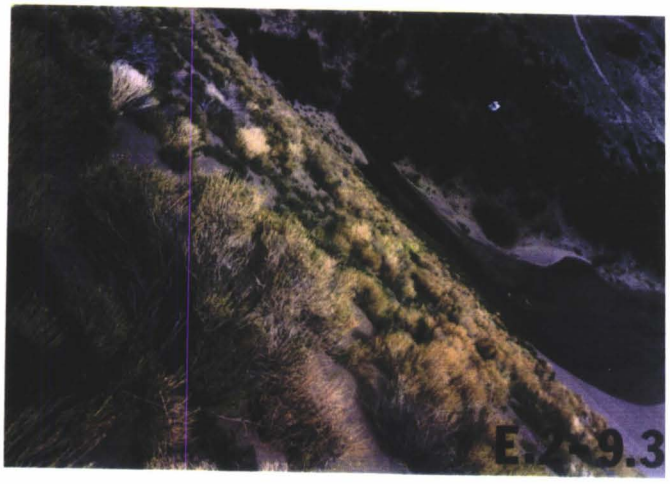
E-9.4

E-9.4A

E-9.7

E-9.8

E-10

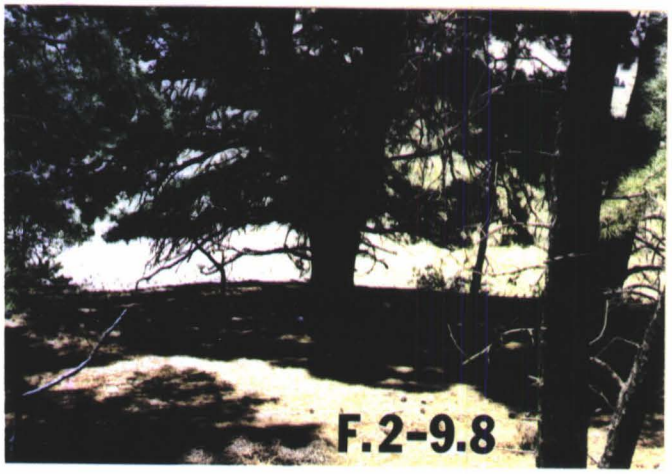

E-9.3

F-3

F-4

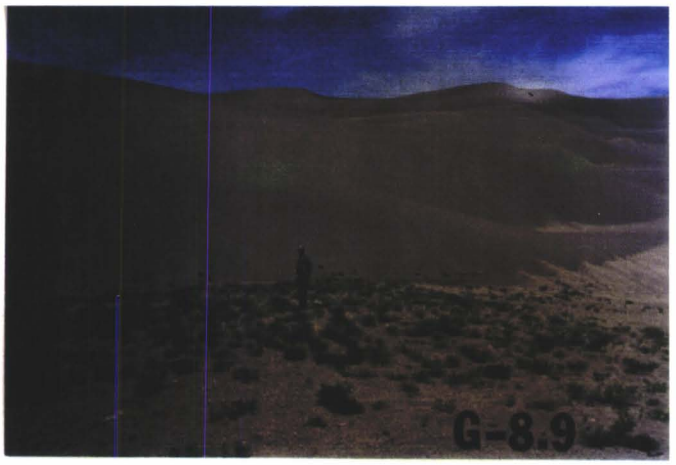
F.2-9.4

F.2-9.5

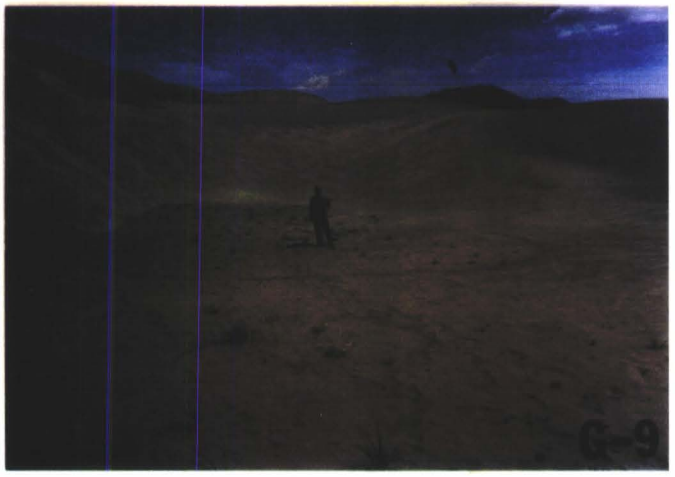

F.2-9.8

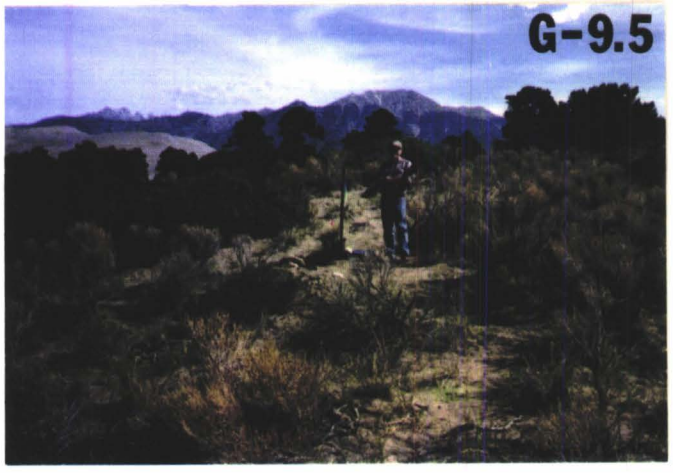
G-4

G-4A

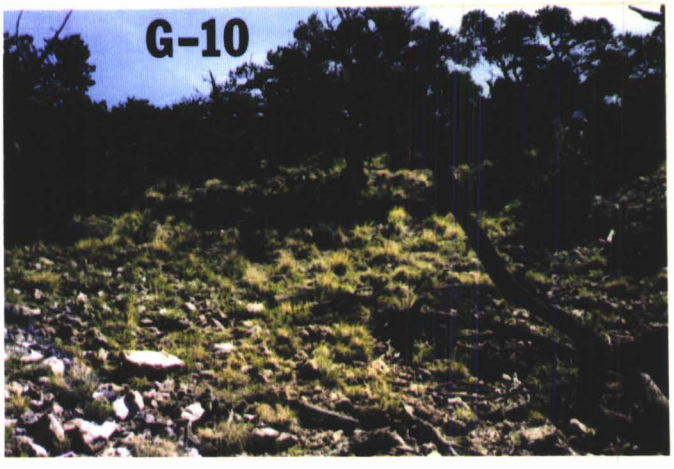

G-8.9

G-8.9


G-9


G-9.5

G-9.7

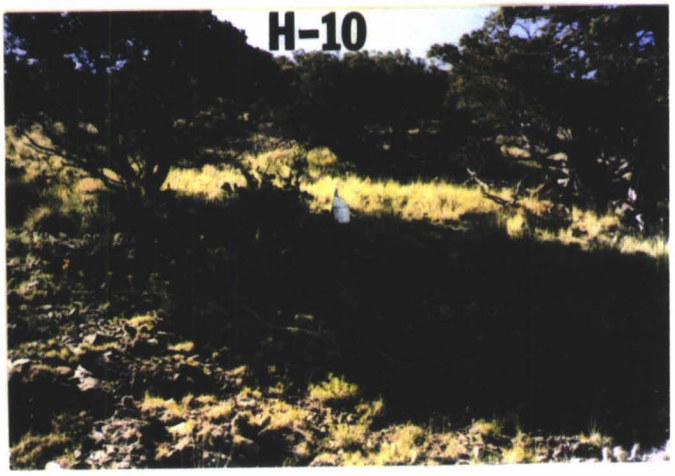

G-10

G.9-9.8

H-3

H-4

H-5


H-10

H.2-4

H.2-9.5

I-3.5

I-5

I-6

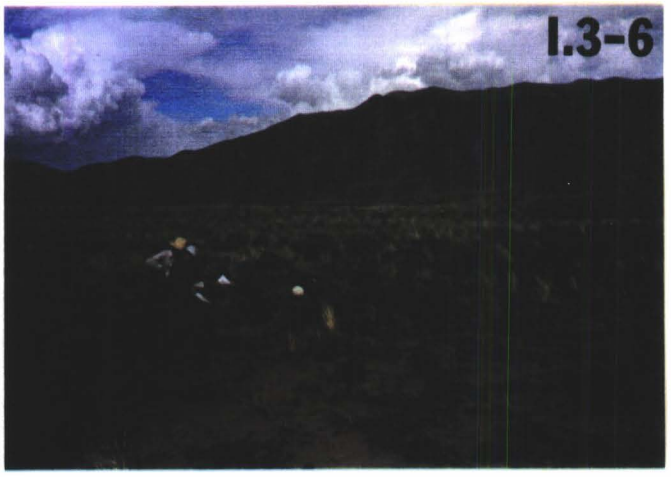
I-6A

I-7

I-7A

I-8

I-9


I.3-6

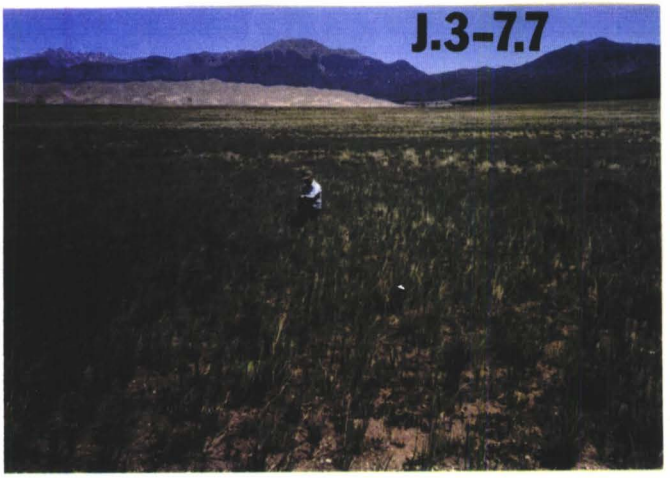
I.4-7.4

J-3.5

J-5

J-6

J-7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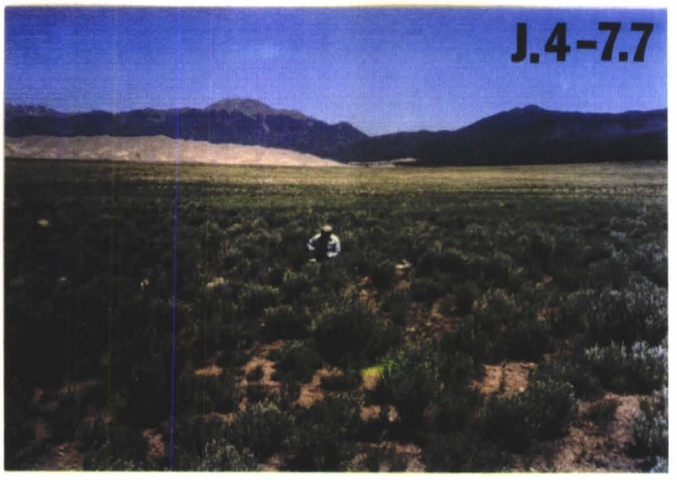
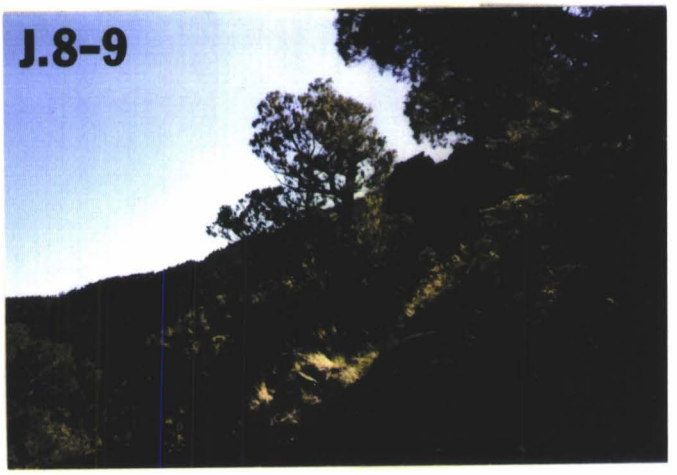
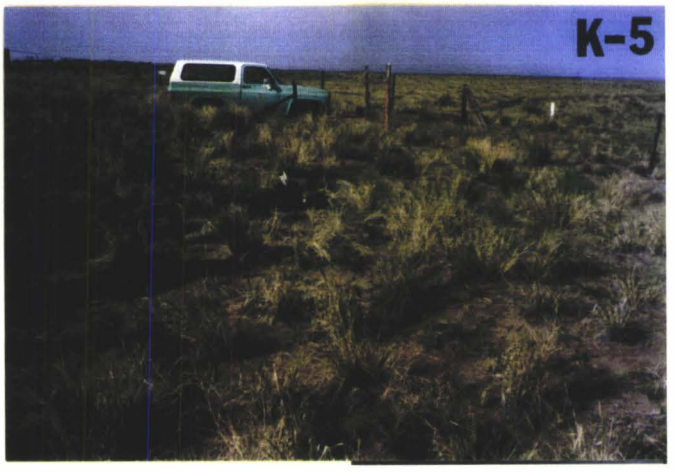

J.4-7.7

J.5-8.5


J.8-9

J.8-9A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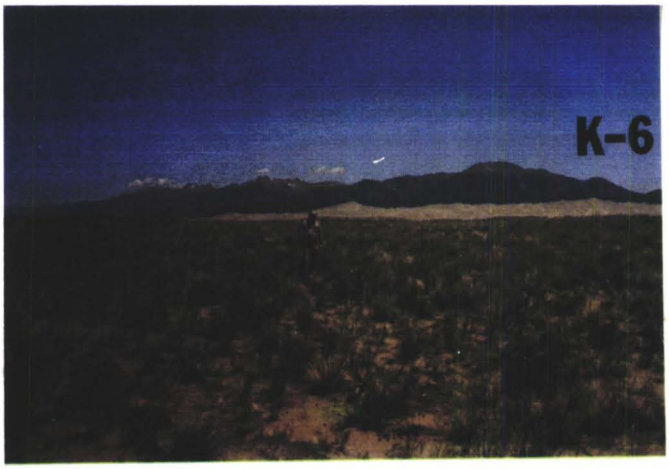
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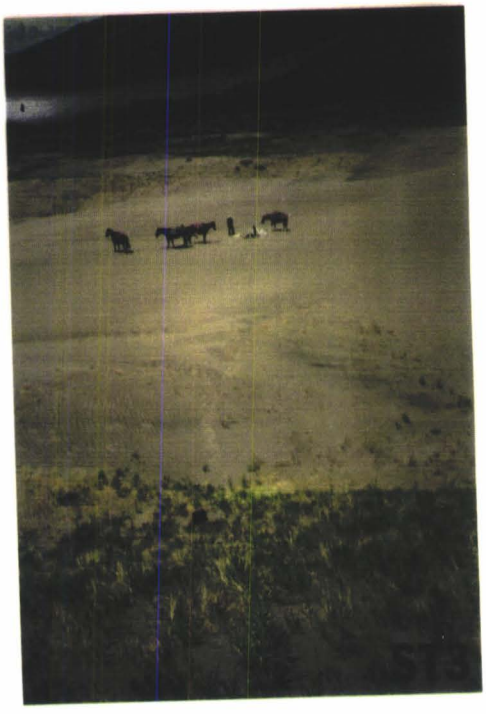
K-7

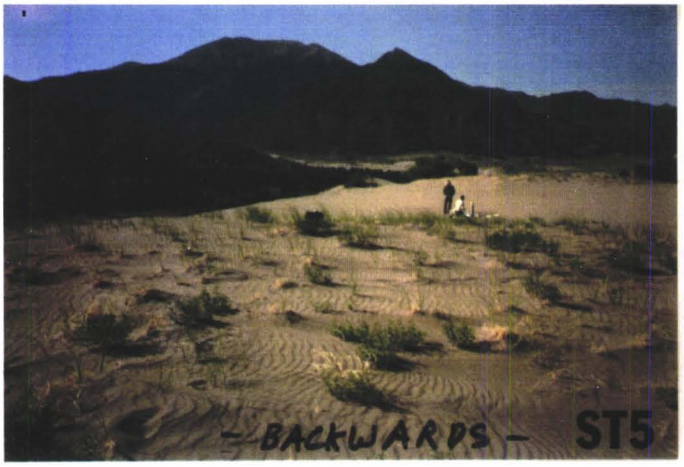
K-8

ST1

ST2



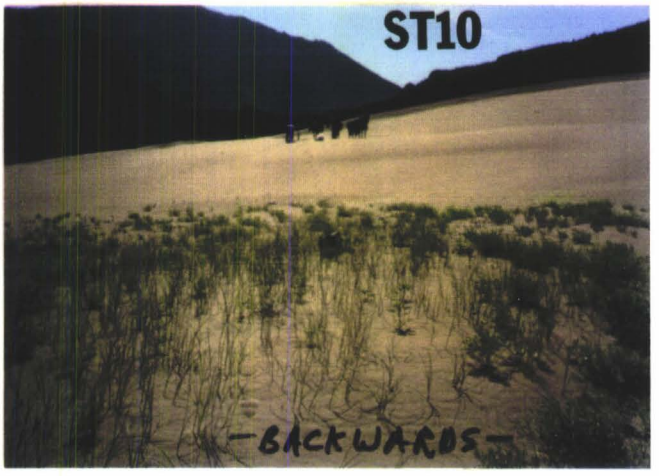
ST4


–BACKWARDS–
ST5

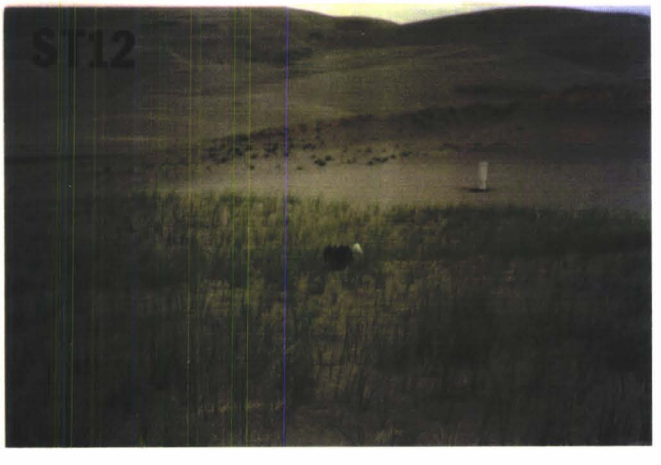
ST6

ST8

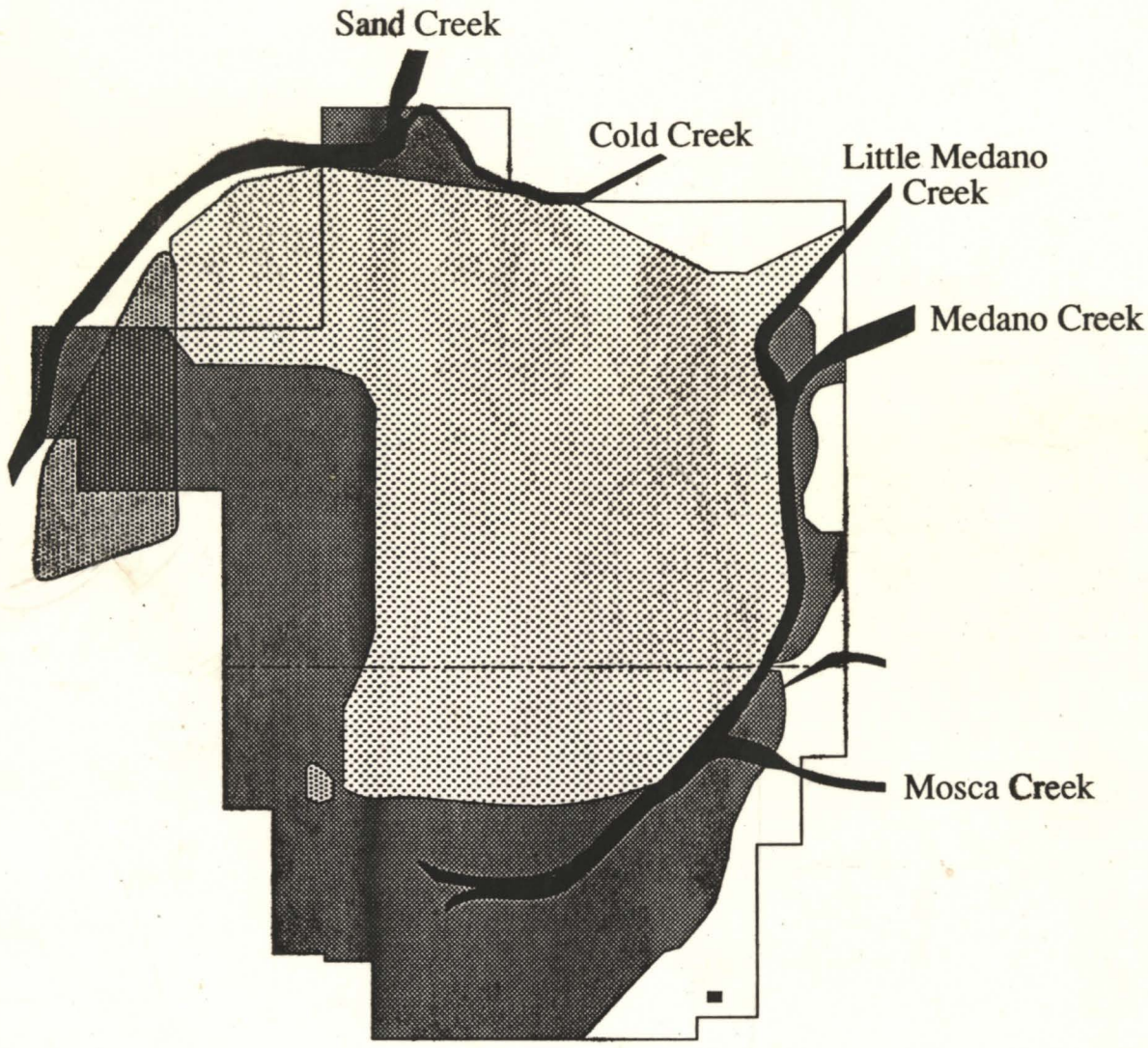
ST9


ST10
–BACKWARDS–

ST11


ST12

VEGETATION PATTERNS: 1960-1990
GREAT SAND DUNES NATIONAL MONUMENT
McArthur and Sanderson, 1992: IA 1268-19105 Final Report



Active Dunes

Stabilized Dunes

Pond and Marsh Areas

Riparian Zones

Alluvial Slopes and Mountain

Great Sand Dunes National Monument

Vegetation Zones